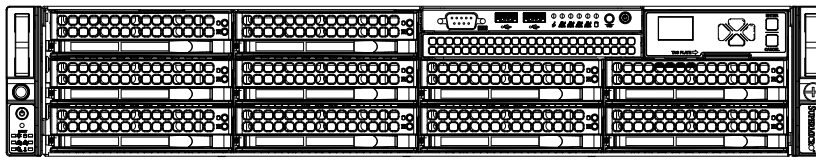
SUPERMICRO®

# SUPERSERVER

# 6027R-N3RF4+
# 6027R-N3RFT+



# USER'S MANUAL

1.0

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# Preface

## About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 6027R-N3RF4+/6027R-N3RFT+. Installation and maintenance should be performed by experienced technicians only.

## Manual Organization

### Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the X9DRW-3LN4F+/X9DRW-3TF+ serverboard and the SC829BTQ-R920B chassis, which comprise the SuperServer 6027R-N3RF4+/6027R-N3RFT+.

### Chapter 2: Server Installation

This chapter describes the steps necessary to install the SuperServer into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

### Chapter 3: System Interface

Refer here for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

### Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the SuperServer 6027R-N3RF4+/6027R-N3RFT+.

### Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X9DRW-3LN4F+/X9DRW-3TF+ serverboard, including the locations and functions of connections, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

### Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC829BTQ-R920B server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SAS or peripheral drives and when replacing system power supply modules and cooling fans.

### Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

### Appendix A: BIOS Error Beep Codes

### Appendix B: System Specifications

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***Appendix A BIOS Error Beep Codes***

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# Chapter 1

# Introduction

## 1-1 Overview

The SuperServer 6027R-N3RF4+/6027R-N3RFT+ is a high-end server comprised of two main subsystems: the SC829BTQ-R920B 2U server chassis and the X9DRW-3LN4F+/X9DRW-3TF+ dual processor serverboard. Please refer to our web site for information on operating systems that have been certified for use with the system (www.supermicro.com).

In addition to the serverboard and chassis, various hardware components have been included with the 6027R-N3RF4+/6027R-N3RFT+, as listed below:

- Four 8-cm high-performance fans (FAN-0118L4)
- One air shroud (MCP-310-29002-0N)
- Two passive CPU heatsinks (SNK-P0048PSC)
- Riser Cards: (see Section 5-6 for details)
  One RSC-R2UW+-2E16-2E8
  One RSC-R2UW-2E8R
- SAS/SATA Accessories
  One SAS backplane (BPN-SAS-829BTQ)
  Two iPass to SATA cables (CBL-0388L-01)
  Two SATA cables (CBL-0226L)
  Ten drive carriers (MCP-220-00075-0B)
  One SGPIO cable (CBL-0388L-01)
- One rackmount kit (MCP-290-00053-0N)
- One CD containing drivers and utilities
- SuperServer 6027R-N3RF4+/6027R-N3RFT+ User's Manual

## 1-2 Serverboard Features

At the heart of the SuperServer 6027R-N3RF4+/6027R-N3RFT+ lies the X9DRW-3LN4F+/X9DRW-3TF+, a dual processor serverboard based on the Intel® C606 chipset. Below are the main features of the serverboard. (See Figure 1-1 for a block diagram of the chipset.)

### Processors

The X9DRW-3LN4F+/X9DRW-3TF+ supports single or dual Intel® E5-2600 Series processors in LGA2011 sockets. Please refer to our web site for a complete listing of supported processors (www.supermicro.com).

### Memory

The X9DRW-3LN4F+/X9DRW-3TF+ has 24 memory sockets that can support up to 768 GB of ECC registered DDR3-1333/1066/800 RDIMMs or up to 192 GB of unbuffered DDR3-1333/1066/800 UDIMMs. Please refer to Chapter 5 for installing memory.

### Onboard SAS

A SAS controller is integrated into the chipset and provides eight SAS ports. The hot-swap SAS drives are connected to a backplane that provides power, bus termination and configuration settings. RAID 0, 1 and 10 is supported.

### Onboard Serial ATA

A SATA controller is integrated into the chipset to provide a six-port SATA subsystem. Two of the ports support SATA 3.0 and four support SATA 2.0 (see Chapter 5 for details). RAID 0, 1, 5 and 10 is supported. The SATA drives are hot-swappable units.

### Rear I/O Ports

The color-coded I/O ports include one COM port, a VGA (monitor) port, two USB 2.0 ports, PS/2 mouse and keyboard ports, one dedicated IPMI LAN port and four gigabit Ethernet ports. Two of the LAN ports on the 6027R-N3RFT+ (X9DRW-3TF+) are 10 Gb Ethernet ports.

### Graphics Controller

The X9DRW-3LN4F+/X9DRW-3TF+ features an integrated G200 (Renesas SH7757 BMC) graphics chip.

## 1-3 Server Chassis Features

The 6027R-N3RF4+/6027R-N3RFT+ is built upon the SC829BTQ-R920B chassis. Details on the chassis and on servicing procedures can be found in Chapter 6.The following is a general outline of the main features of the chassis.

### System Power

The SC829BTQ-R920B features a redundant 920W power supply consisting of two power modules. The system does not need to be shut down when replacing or removing a single power supply module.

### Hard Drives

The SC829BTQ-R920B chassis was designed to support ten 3.5" hot-swap hard drives.

### PCI Expansion Slots

Two riser cards are included to support four standard size and two low-profile add-on cards. See section 5-6 of this manual for details.

### Front Control Panel

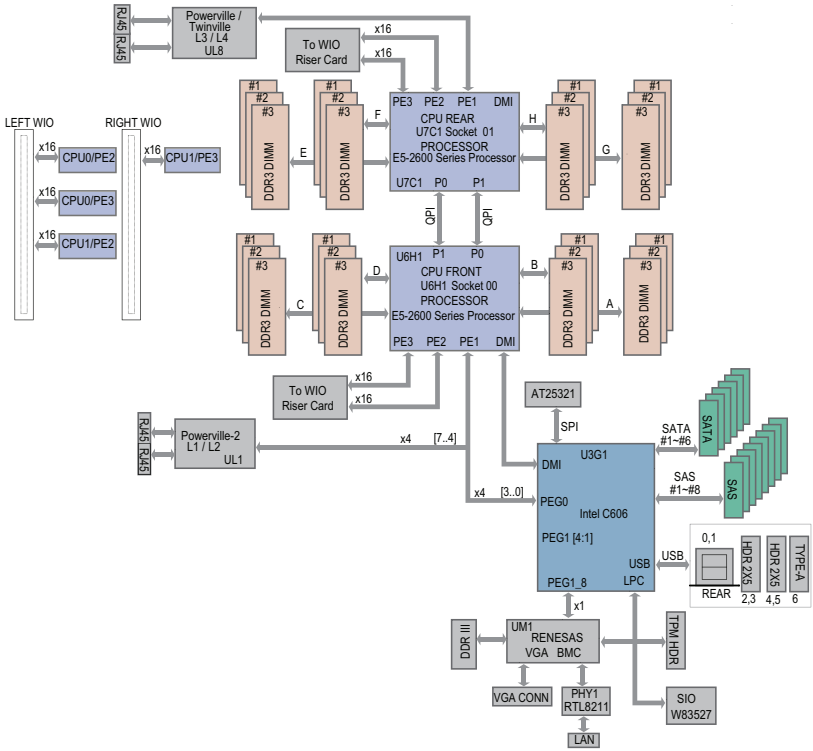
The chassis' control panel provides you with system monitoring and control. LEDs indicate system power, HDD activity, network activity (2), overheat/fan failure and power failure. A main power button and a reset button are also included.

### Cooling System

The SC829BTQ-R920BP has an innovative cooling design that features four 8-cm high-performance fans. Fan speed can be determined by system temperature via IPMI. Each power supply module also includes a cooling fan.

**Figure 1-1. Intel C606 Chipset: System Block Diagram**

Note: This is a general block diagram. Please see Chapter 5 for details.



## 1-4 Contacting Supermicro

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# Notes

# Chapter 2

# Server Installation

## 2-1 Overview

This chapter provides a quick setup checklist to get your 6027R-N3RF4+/6027R-N3RFT+ up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your system has come to you with the processors and memory pre-installed. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

## 2-2 Unpacking the System

You should inspect the box the 6027R-N3RF4+/6027R-N3RFT+ was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the server. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Be sure to read the Rack and Server Precautions in the next section.

## 2-3 Preparing for Setup

The box the server was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

### Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.This product is for

installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

- This product is not suitable for use with visual display work place devices acccording to §2 of the the German Ordinance for Work with Visual Display Units.

## Warnings and Precautions!

### Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

### Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SAS drives and power supply modules to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

## Rack Mounting Considerations

### *Ambient Operating Temperature*

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

### *Reduced Airflow*

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

### *Mechanical Loading*

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

### *Circuit Overloading*

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

### *Reliable Ground*

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

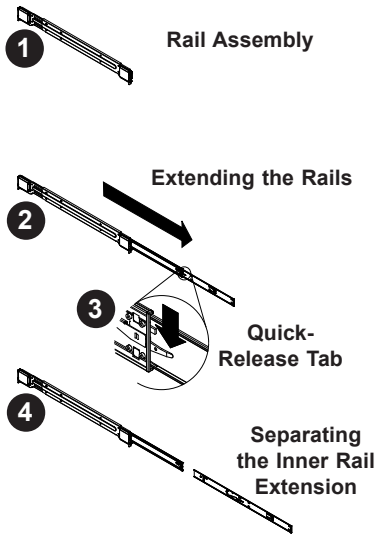
## 2-4 Installing the System into a Rack

This section provides information on installing the server into a rack unit with the rack rails provided. If the system has already been mounted into a rack, you can skip ahead to Sections 2-5 and 2-6. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

### Separating the Sections of the Rack Rails

The chassis package includes two rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself.

**Figure 2-1. Separating the Rack Rails**




***Separating the Inner and Outer Rails***

1. Locate the rail assembly in the chassis packaging.
2. Extend the rail assembly by pulling it outward.
3. Press the quick-release tab.
4. Separate the inner rail extension from the outer rail assembly.

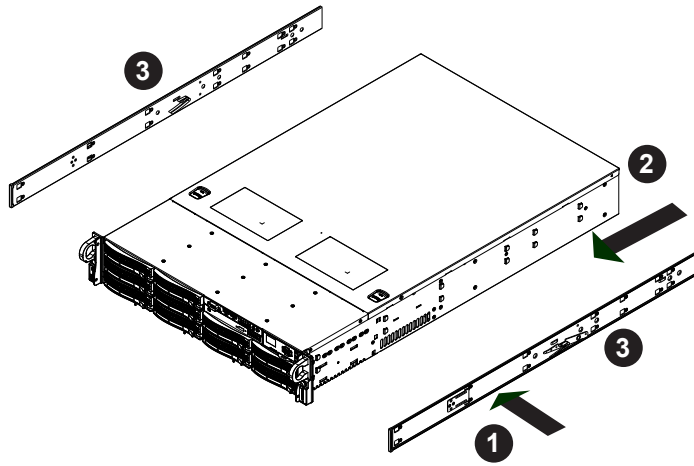



**Figure 2-2. Installing the Inner Rail Extensions**

## Installing the Inner Rail Extensions

The SC829B chassis includes a set of inner rails in two sections: inner rails and inner rail extensions. The inner rails are pre-attached to the chassis, and do not interfere with normal use of the chassis if you decide not to use a server rack. The inner rail extension is attached to the inner rail to mount the chassis in the rack.

***Installing the Inner Rails***

1. Place the inner rail extensions on the side of the chassis aligning the hooks of the chassis with the rail extension holes. Make sure the extension faces "outward" just like the pre-attached inner rail.

2. Slide the extension toward the front of the chassis.

Optional: Secure the chassis with two screws. Repeat for the other inner rail extension.

## Outer Rack Rails

Outer rails attach to the rack and hold the chassis in place. The outer rails for the SC829 chassis extend between 30 inches and 33 inches.

***Installing the Outer Rails to the Rack***

1. Secure the back end of the outer rail to the rack, using the screws provided.
2. Press the button where the two outer rails are joined to retract the smaller outer rail.
3. Hang the hooks of the rails onto the rack holes and if desired, use screws to secure the front of the outer rail onto the rack.
4. Repeat steps 1-3 for the remaining outer rail.

**Locking Tabs**

Both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

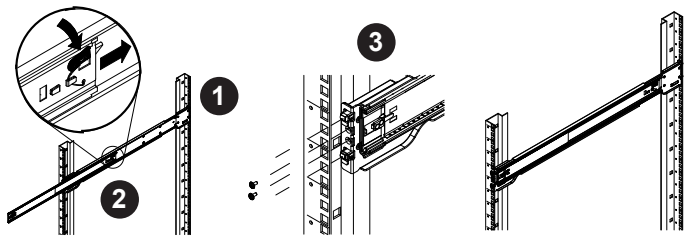


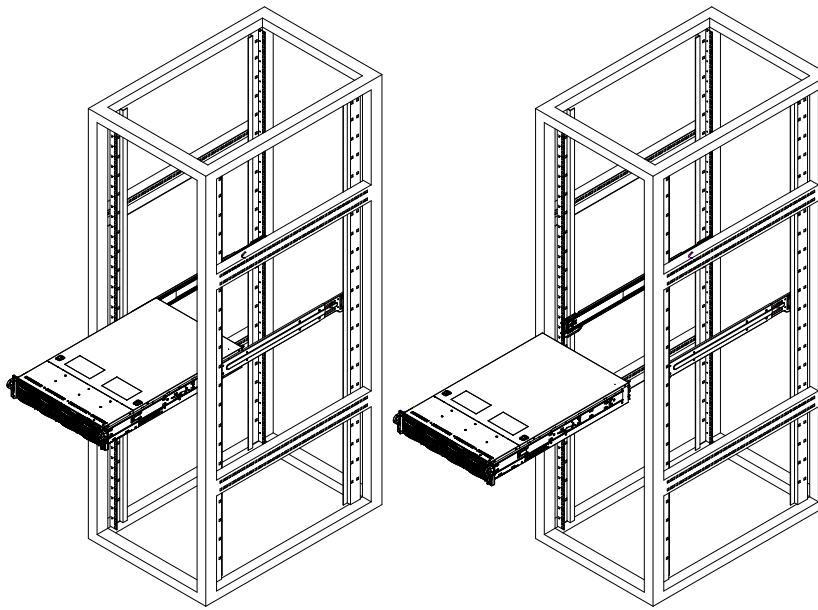

**Figure 2-3. Assembling the Outer Rails**

## Installing the Chassis into a Rack

***Installing the Chassis into a Rack***

1. Extend the outer rails as illustrated above.
2. Align the inner rails of the chassis with the outer rails on the rack.
3. Slide the inner rails into the outer rails, keeping the pressure even on both sides. When the chassis has been pushed completely into the rack, it should click into the locked position.
4. Optional screws may be used to secure the to hold the front of the chassis to the rack.

**Figure 2-4. Installing the Server into a Rack**



## Notes

# Chapter 3

# System Interface

## 3-1 Overview

There are several LEDs on the control panel as well as others on the hard drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel and an on/off switch on the power supply. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

## 3-2 Control Panel Buttons

There are two push-buttons located on the front of the chassis: a reset button and a power on/off button.

### Reset

The reset button is used to reboot the system.

### Power

The main power switch is used to apply or remove power from the power supply to the server system. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

## 3-3 Control Panel LEDs

The control panel located on the front of the SC829BTQ chassis has five LEDs. These LEDs provide you with critical information related to different parts of the

system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

### Power Failure

When this LED flashes, it indicates a power failure in the power supply.

### Overheat/Fan Fail

This LED turns on when either the front or the rear UID button is pushed. Pushing either button a second time will turn this LED off.

When this LED flashes it indicates a fan failure. When on continuously (on and not flashing) it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain flashing or on as long as the overheat condition exists.

### NIC2

Indicates network activity on LAN2 when flashing .

### NIC1

Indicates network activity on LAN1 when flashing.

### HDD

Indicates IDE channel activity. On the 6027R-N3RF4+/6027R-N3RFT+ this light indicates HDD and/or DVD-ROM drive activity when flashing.

### Power

Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

## 3-4 OLED Screen

A feature-rich, 1" color display screen using the latest OLED technology. OLED displays are thinner and lighter than traditional LCD displays, providing better power efficiency and offering wider viewing angles with improved clarity. With four lines of characters and 12 characters per line, the OLED screen module displays vivid colors with 64 x 96 pixels and 16 bit color. More details are available on our web site at http://www.supermicro.com/lcd.

## 3-5 Drive Carrier LEDs

- **Green:** Each hard drive carrier has a green LED. When illuminated, this green LED indicates drive activity. A connection to the backplane enables this LED to blink on and off when that particular drive is being accessed. Please refer to Chapter 6 for instructions on replacing failed hard drives.

- **Red:** The red LED to indicate a hard drive failure. If one of the drives fail, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed hard drives.

## Notes

# Chapter 4

# System Safety

## 4-1 Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperServer 6027R-N3RF4+/6027R-N3RFT+ from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.
- Do not work alone when working with high voltage components.
- Power should always be disconnected from the system when removing or installing main system components, such as the serverboard, memory modules and floppy drive. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.
- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.
- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.
- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets. The unit has more than one power

supply cord. Disconnect both power supply cords before servicing to avoid electrical shock

- Serverboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer (CR2032). Dispose of used batteries according to the manufacturer's instructions.

- DVD-ROM Laser: **CAUTION** - this server may have come equipped with a DVD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced. Contact technical support for details and support.

## 4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the system clean and free of clutter.

- The 6027R-N3RF4+/6027R-N3RFT+ weighs approximately 55 lbs. (25 kg.). When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit after ensuring that all connections have been made.

## 4-3 ESD Precautions

Electrostatic Discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.

- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.

- Touch a grounded metal object before removing the board from the antistatic bag.

- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.

- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.

- When handling chips or modules, avoid touching their pins.

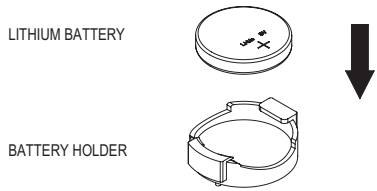
- Put the serverboard and peripherals back into their antistatic bags when not in use.

- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

## 4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the 6027R-N3RF4+/6027R-N3RFT+ is operating to assure proper cooling. Out of warranty damage to the system can occur if this practice is not strictly followed.

**Figure 4-1. Installing the Onboard Battery**



Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

# Chapter 5

# Advanced Serverboard Setup

This chapter covers the steps required to install processors and heatsinks to the X9DRW-3LN4F+/X9DRW-3TF+ serverboard, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are described and a layout and quick reference chart are included in this chapter. Remember to close the chassis completely when you have finished working on the serverboard to protect and cool the system sufficiently.

## 5-1 Handling the Serverboard

Static electrical discharge can damage electronic components. To prevent damage to printed circuit boards, it is important to handle them very carefully (see Chapter 4). Also note that the size and weight of the serverboard can cause it to bend if handled improperly, which may result in damage. To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling.

The following measures are generally sufficient to protect your equipment from static discharge.

### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

### Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

## 5-2 Installing the Processor and Heatsink

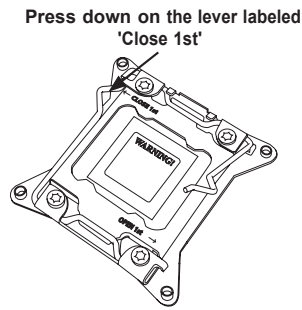
When handling the processor package, avoid placing direct pressure on the label area of the fan.

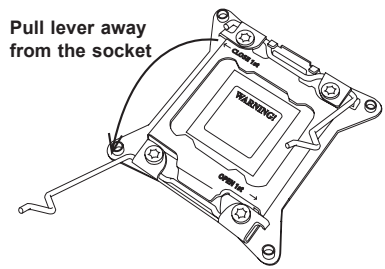
**Notes:**

- Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the serverboard into the chassis before you install the CPU heatsinks.
- When receiving a serverboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.
- Refer to the Supermicro web site for updates on CPU support.

### Installing an LGA2011 Processor

1. There are two levers on the LGA2011 socket. First press and release the load lever labeled 'Open 1st' on CPU Socket #1.
2. Press the second load lever labeled 'Close 1st' to release the load plate from its locked position.



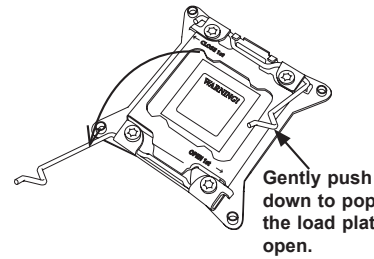



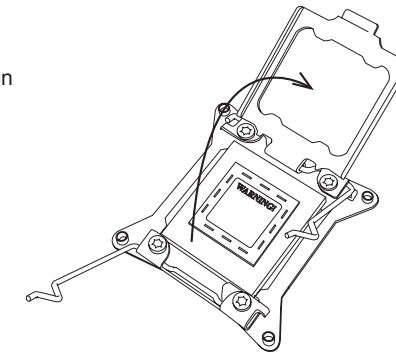
3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.

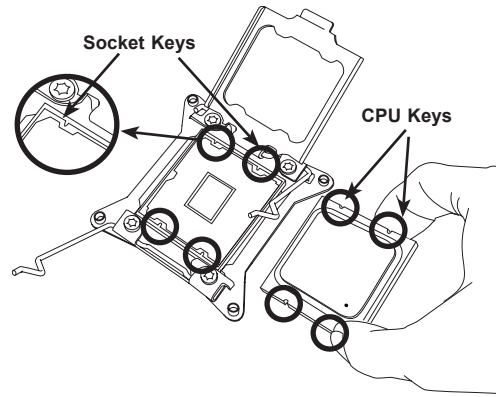
4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.

5. Use your thumb and index finger to hold the CPU by its edges. Align the CPU keys, which are semi-circle cutouts, against the socket keys.

6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically and do not rub the CPU against any pins of the socket, which may damage the CPU or the socket.)



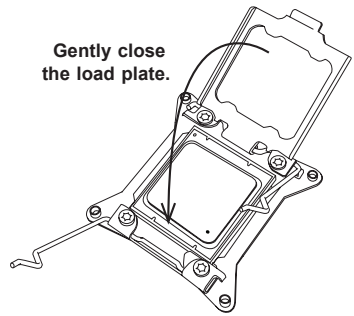


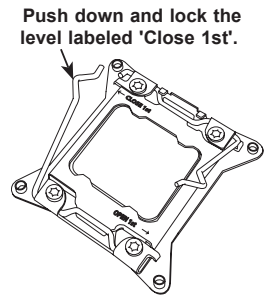
**Warning:** You can only install the CPU to the socket in one direction. Make sure that the CPU is properly inserted into the socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

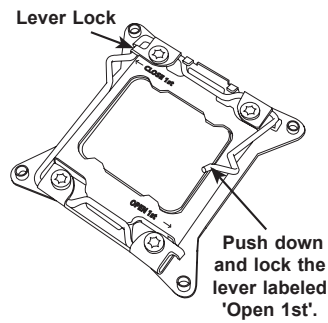
7. With the CPU in the socket, inspect the four corners of the CPU to make sure that they are flush with the socket.

8. Close the load plate. Lock the lever labeled 'Close 1st', then lock the lever labeled 'Open 1st'. Use your thumb to gently push the load levers down until the lever locks.

9. Repeat steps to install a CPU to CPU Socket #2 if needed.



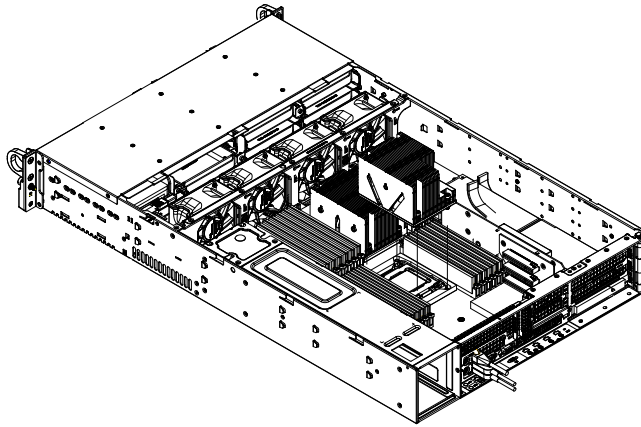
## Installing a CPU Heatsink

1. Place the heatsink on top of the CPU, referring to Figure 5-1 for correct orientation. An incorrect heatsink orientation will interfere with the add-on cards.

2. Screw in two diagonal screws until just snug (do not over-tighten the screws, which may damage the CPU).

3. Finish the installation by fully tightening all four screws.

**Figure 5-1. Installing a Heatsink**



## Removing the Heatsink

**Warning:** We do not recommend removing the CPU or the heatsink. If you do need to remove the heatsink, please follow the instructions below to prevent damage to the CPU or other components.

1. Shut down the system and unplug the power cord from the power supply.

1. Unscrew and remove the heatsink screws in the sequence described above.

2. Hold the heatsink and gently wiggle it to loosen it from the CPU. (Do not use excessive force when doing this!)

3. Once the heatsink is loosened, remove it from the CPU.

4. Clean the surface of the CPU and the heatsink to remove the old thermal grease. Reapply the proper amount of thermal grease before re-installing.

## 5-3 Connecting Cables

Now that the processors are installed, the next step is to connect the cables to the serverboard.

### Connecting Data Cables

The cables used to transfer data from the peripheral devices have been carefully routed in preconfigured systems to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to reroute them as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). If you are configuring the system, keep the airflow in mind when routing the cables.

The following data cables (with their connector locations noted) should be connected. See the serverboard layout diagram in this chapter for connector locations.

- SAS (SAS0 ~ SAS7) and SATA (SATA0 ~ 1) cables
- Control Panel cable (JF1, see next page)

See Chapter 6 for drive configuration.

### Connecting Power Cables

The X9DRW-3LN4F+/X9DRW-3TF+ has a 24-pin primary power supply connector designated JPW1 for connection to the ATX power supply. Connect the appropriate connector from the power supply to JPW1 to supply power to the serverboard. See the Connector Definitions section in this chapter for power connector pin definitions.

In addition, your power supply must be connected to the 8-pin Processor Power connectors at JPW2 and JPW3.

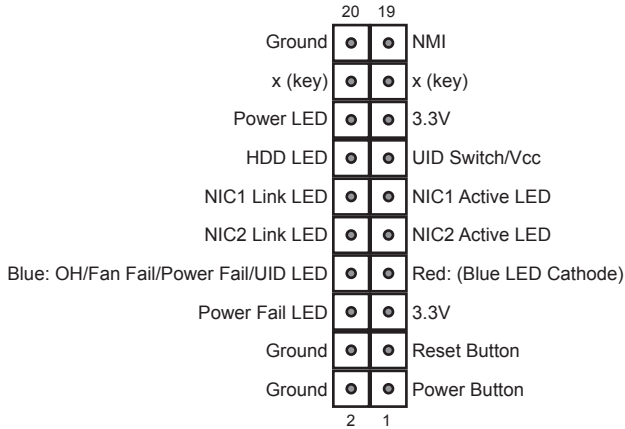
### Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-2 for the pin locations of the front control panel buttons and LED indicators. Please note that even and odd numbered pins are on opposite sides of each header.

All JF1 wires have been bundled into single keyed ribbon cable to simplify their connection. The red wire in the ribbon cable plugs into pin 1 of JF1. Connect the other end of the cable to the Control Panel printed circuit board, located just behind the system status LEDs in the chassis.

See the Connector Definitions section in this chapter for details and pin descriptions of JF1.

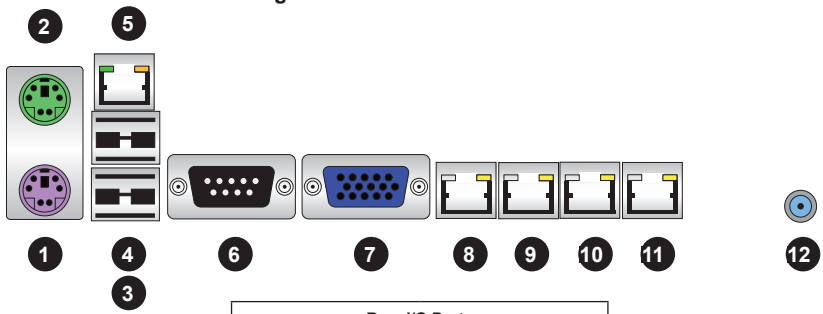
**Figure 5-2. Front Control Panel Header Pins (JF1)**




## 5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

**Figure 5-3. Rear Panel I/O Ports**




| Rear I/O Ports | |
|---|---|
| 1. Keyboard | 7. VGA Port |
| 2. PS/2 Mouse | 8. LAN1 Port |
| 3. USB0 | 9. LAN2 Port |
| 4. USB1 | 10. LAN3 Port* |
| 5. Dedicated IPMI LAN | 11. LAN4 Port* |
| 6. COM1 | 12. UID Button |

*LAN3 and LAN4 are 10 Gb ports on the 6027R-N3RFT+ (X9DRW-3TF+).

## 5-5 Installing Memory

Note: Check the Supermicro web site for recommended memory modules.

***CAUTION***

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

***Installing DIMMs***

1. Insert the desired number of DIMMs into the memory slots, starting with slot P1-DIMMA1. For best performance, install memory modules of the same type and same speed in the slots as indicated in the tables below.

2. Insert each DIMM vertically into its slot. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM module incorrectly (see Figure 5-4).

3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules

**Memory Support**

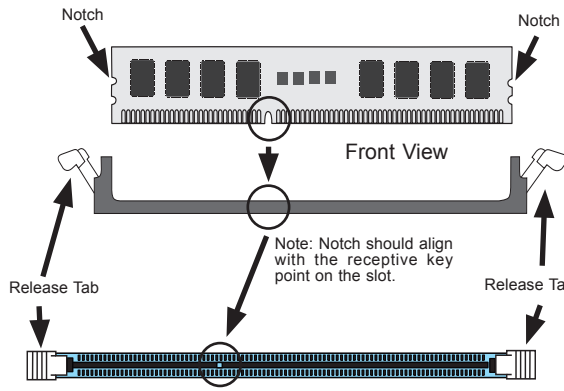
The X9DRW-3LN4F+/X9DRW-3TF+ has 24 memory sockets that can support up to 768 GB of ECC registered DDR3-1333/1066/800 RDIMMs or up to 192 GB of unbuffered DDR3-1333/1066/800 UDIMMs. Please refer to Chapter 5 for installing memory.

**Note:** Memory speed support depends on the type of CPU used.

**Figure 5-4. Installing DIMM into Slot**

**To Install:** Insert module vertically and press down until it snaps into place. Pay attention to the alignment notch at the bottom.

**To Remove:**
Use your thumbs to gently push the release tabs near both ends of the module. This should release it from the slot.




Top View of DDR3 Slot

*Processor & Memory Module Population Configuration*

For memory to work properly, follow the tables below for memory installation.

| Processors and their Corresponding Memory Modules | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CPU#** | **Corresponding DIMM Modules** | | | | | | | | | | | |
| **CPU 1** | P1-A1 | P1-A2 | P1-A3 | P1-B1 | P1-B2 | P1-B3 | P1-C1 | P1-C2 | P1-C3 | P1-D1 | P1-D2 | P1-D3 |
| **CPU2** | P2-E1 | P2-E2 | P2-E3 | P2-F1 | P2-F2 | P2-F3 | P2-G1 | P2-G2 | P2-G3 | P2-H1 | P2-H2 | P2-H3 |

| Processor and Memory Module Population | |
|---|---|
| **Number of CPUs+DIMMs** | **CPU and Memory Population Configuration Table (For memory to work properly, please follow the tables below.)** |
| **1 CPU & 2 DIMMs** | CPU1<br>P1-A1/P1-B1 |
| **1 CPU & 4 DIMMs** | CPU1<br>P1-A1/P1-B1, P1-C1/P1-D1 |
| **1 CPU & 5~8 DIMMs** | CPU1<br>P1-A1/P1-B1, P1-C1/P1-D1, P1-A2/P1-B2, P1-C2/P1-D2 |
| **2 CPUs & 4 DIMMs** | CPU1 + CPU2<br>P1-A1/P1-B1, P2-E1/P2-F1 |
| **2 CPUs & 6 DIMMs** | CPU1 + CPU2<br>P1-A1/P1-B1, P2-E1/P2-F1, P1-C1/P1-D1 |
| **2 CPUs & 8 DIMMs** | CPU1 + CPU2<br>P1-A1/P1-B1, P2-E1/P2-F1, P1-C1/P1-D1, P2-G1/P2-H1 |
| **2 CPUs & 9~12 DIMMs** | CPU1/CPU2<br>P1-A1/P1-B1, P2-E1/P2-F1, P1-C1/P1-D1, P2-G1/P2-H1, P1-A2/P1-B2, P2-E2/P2-F2 |
| **2 CPUs & 13 DIMMs~24 DIMMs** | CPU1/CPU<br>P1-A1/P1-B1, P2-E1/P2-F1, P1-C1/P1-D1, P2-G1/P2-H1, P1-A2/P1-B2, P2-E2/P2-F2, P1-C2/P1-D2, P2-G2/P2-H2, P1-A3/P1-B3, P2-E3/P2-F3, P1-C3/P1-D3, P2-G3/P2-H3 |

| UDIMM Support | | | |
|---|---|---|---|
| **DIMMs Populated per DDR Channel** | **UDIMM Type (Unb. DIMM)** | **POR Speeds (in MHz)** | **Ranks per DIMM (Any Combination)** |
| 1 | ECC/Non-ECC DDR3 | 1066, 1333 | SR, DR |
| 2 | ECC/Non-ECC DDR3 | 1066, 1333 | SR, DR |

| RDIMM Support | | | |
|---|---|---|---|
| **DIMMs Populated per DDR Channel** | **RDIMM Type (Reg. DIMM)** | **POR Speeds (in MHz)** | **Ranks per DIMM (Any Combination)** |
| 1 | Reg. ECC DDR3 | 1066, 1333, 1600 | SR, DR |
| 2 | Reg. ECC DDR3 | 1066, 1333,1600 | SR, DR |
| 3 | Reg. ECC DDR3 | 800, 1066 | SR, DR |
| 1 | Reg. ECC DDR3 | 1066 | QR |
| 2 | Reg. ECC DDR3 | 800 | QR |

| LRDIMM Support | | | |
|---|---|---|---|
| **DIMMs Populated per DDR Channel** | **LRDIMM Type (Load Reduced DIMM)** | **POR Speeds (in MHz)** | **Ranks per DIMM (Any Combination)** |
| 1 | LR ECC DDR3 | 1066, 1333 | QR |
| 2 | LR ECC DDR3 | 1066, 1333 | QR |
| 3 | LR ECC DDR3 | 1066 | QR |

**Note**

All channels in a system will run at the fastest common frequency.

## 5-6 Adding PCI Cards

### PCI Expansion Slots

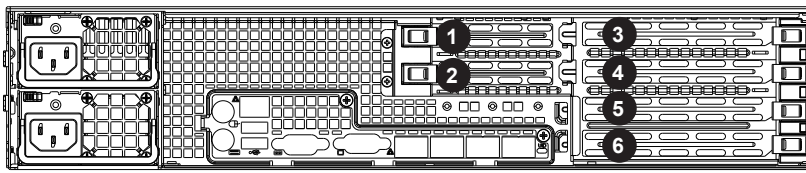
Riser cards installed to the system allow you to add PCI expansion cards (see below). The 6027R-N3RF4+/6027R-N3RFT+ can support the use of four standard size and two low-profile expansion cards (with pre-installed riser cards).

### PCI Card Installation

Before installing a PCI add-on card, make sure you power off the system first. Begin by removing the top chassis cover. Two riser cards should be pre-installed into the system. Remove the screws that secure the riser cards to the rear of the chassis then lift the riser card assembly from the chassis. Insert the PCI card into the riser card slot, pushing down with your thumbs evenly on both sides of the card - note that the add-on card attaches to the riser card with a single screw.

After the card has been installed, reinsert the riser card back into the expansion slot on the board, then secure it with the same screws you removed previously. Finish by replacing the chassis cover.

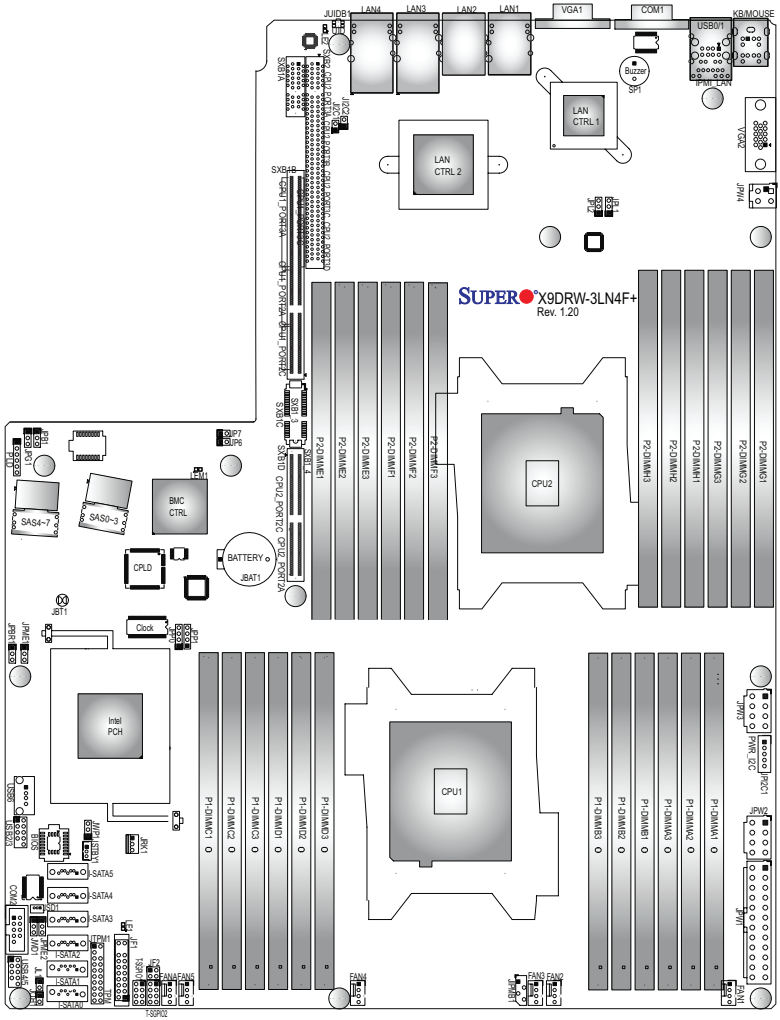
| Riser Card Configurations | |
|---|---|
| **Riser Card** | **Expansion Card Supported** |
| RSC-R2UW-2E8R | 2x low-profile PCI-E x8 cards |
| RSC-R2UW+-2E16-2E8 | 2x standard PCI-E x16 cards, 2x standard PCI-E x8 cards |




| Riser Card Configurations | | |
|---|---|---|
| 1. x8 low-profile, half length (6.6") | 3. x16 full height, 16.5" length | 5. x16 full height, 10" length |
| 2. x8 low-profile, half length (6.6") | 4. x8 full height, 16.5" length | 6. x8 full height, half length (6.6") |

## 5-7 Serverboard Details

**Figure 5-5. SUPER X9DRW-3LN4F+/X9DRW-3TF+ Layout**




**Notes:**

Jumpers not indicated are for test purposes only.

## X9DRW-3LN4F+/X9DRW-3TF+ Quick Reference

| Jumper | Description | Default Setting |
|---|---|---|
| JBT1 | Clear CMOS | See Section 5-9 |
| JI²C1/ JI²C2 | SMB to PCI-E Slots | Pins 2-3 (Normal) |
| JPB1 | BMC Enable/Disable | Pins 1-2 (Enabled) |
| JPG1 | VGA Enable/Disable | Pins 1-2 (Enabled) |
| JPL1 | LAN1/LAN2 Enable/Disable | Pins 1-2 (Enabled) |
| JPL2 | LAN3/LAN4 Enable/Disable | Pins 1-2 (Enabled) |
| JWD1 | Watch Dog | Pins 1-2 (Reset) |

| Connector | Description |
|---|---|
| COM1/COM2 | Backplane COM Port1/Front Accessible COM2 Header |
| FAN1~5, FANA | CPU/System Fan Headers |
| I-SATA 0~5 | Intel SB SATA Ports 0~5 |
| JF1 | Front Panel Control Header |
| JF2 | LAN 3/4 Link/Activity LED Indicators |
| JIPMB1 | 4-pin External BMC I²C Header (for IPMI Card) |
| JL1 | Chassis Intrusion Header |
| JOH1 | Overheat/Fan Fail LED Header |
| JPI²C1 | Power Supply SMBbus I²C Header |
| JPW1 | ATX 24-Pin Power Connector |
| JPW2/JPW3 | 12V 8-Pin Power Connectors |
| JPW4 | 12V 4-Pin Power Connector |
| JRK1 | RAIDKey |
| JSD1 | SATA DOM (Device On Module) Power Connector |
| JSTBY1 | Standby Power Header |
| JTPM1 | TPM (Trusted Platform Module)/Port 80 |
| KB/Mouse | Keyboard/Mouse |
| LAN1/2 | G-bit Ethernet LAN Ports 1/2 |
| LAN3/4 | 1 GB (X9DRW-3LN4F+)/10 GB ((X9DRW-3TF+) Ports |
| (IPMI) LAN | Dedicated IPMI LAN Port |
| SAS 0~3, 4~7 | SAS Ports 0~3, 4~7 |

Quick Reference table continued on next page.

| | |
|---|---|
| SP1 | Onboard Buzzer (Internal Speaker) |
| SXB1A/1B/1C | SMC-Proprietary WIO_L (Left) Add-On Card Slot |
| SXB2 | SMC-Proprietary WIO_R (Right) Add-On Card Slot |
| T-SGPIO 1/2 | Serial-Link General_Purpose IO Headers (J17/J18) |
| USB 0/1 | Rear I/O USB 0/1 Ports |
| USB 2/3, 4/5 | Front Accessible USB 2/3, 4/5 Headers |
| USB 6 | Front Panel Type A USB 6 Port |
| UID Switch | UID (Unit Identifier) Switch (JUID1) |
| VGA1/2 | Rear I/O VGA Port 1/Front Panel VGA Port2 |

| LED | Description | State | Status |
|---|---|---|---|
| LE1 | Standby PWR LED | Green: On | SB Power On |
| LE2 | UID LED | Blue: On (Windows OS), Blinking (Linux) | Unit Identified |
| LEM1 | BMC Heartbeat LED | Green: Blinking | Normal |

## 5-8 Connector Definitions

### ATX Power Connector

The primary ATX power supply connector meets the SSI EPS 12V specification. Make sure that the orientation of the connector is correct. See the table on the right for pin definitions.

**ATX Power 24-pin Connector Pin Definitions**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 13 | +3.3V | 1 | +3.3V |
| 14 | -12V | 2 | +3.3V |
| 15 | COM | 3 | COM |
| 16 | PS_ON | 4 | +5V |
| 17 | COM | 5 | COM |
| 18 | COM | 6 | +5V |
| 19 | COM | 7 | COM |
| 20 | Res (NC) | 8 | PWR_OK |
| 21 | +5V | 9 | 5VSB |
| 22 | +5V | 10 | +12V |
| 23 | +5V | 11 | +12V |
| 24 | COM | 12 | +3.3V |

### Processor Power Connectors

JPW2 and JPW3 must also be connected to the power supply to provide power for the processor(s). See the table on the right for pin definitions.

**12V 8-Pin Power Connector Pin Definitions**

| Pins | Definition |
|---|---|
| 1 through 4 | Ground |
| 5 through 8 | +12V |

### 4-pin Power Connectors

JPW4 should also be connected to the power supply. See the table on the right for pin definitions.

**12V 4-pin Power Connector Pin Definitions**

| Pins | Definition |
|---|---|
| 1~2 | Ground |
| 3~4 | +12V |

**Warning**: To prevent damage to your power supply or serverboard, please use a power supply that contains a 24-pin and two 8-pin power connectors. Be sure to connect these power connectors to the 20-pin and the two 8-pin power connectors on your serverboard for adequate power supply to your system. Failure to do so will void the manufacturer warranty on your power supply and serverboard.

### NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

| NMI Button Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 19 | Control |
| 20 | Ground |

### Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

| Power LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 15 | Vcc |
| 16 | Control |

### HDD LED/UID Switch

The HDD LED/UID switch connections are located on pins 13/14 of JF1. Attach an LED cable to display HDD activity. This connection can also be used as a front panel UID (Unit Identifier) switch. The UID LED on pin 7 of JF1 works in conjunction with this UID switch. When the user presses and releases the UID switch, the UID LED will be turned on or off to indicate the location of the unit.

| HDD/UID Switch Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 13 | UID Signal/3.3V SB |
| 14 | HD Active |

### NIC1 LED

The NIC1 (Network Interface Controller) LED connection is located on pins 11 and 12 of JF1. Attach the NIC1 LED cable to display network activity. Refer to the table on the right for pin definitions.

| NIC1 LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 11 | Vcc |
| 12 | Ground |

### NIC2 LED

The NIC2 (Network Interface Controller) LED connection is located on pins 9 and 10 of JF1. Attach the NIC2 LED cable to display network activity. Refer to the table on the right for pin definitions.

| NIC2 LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 9 | Vcc |
| 10 | Ground |

### Overheat (OH)/Fan Fail/PWR Fail/ UID LED

Connect an LED to pins 7 and 8 of JF1 to provide advanced warning of chassis overheating or fan failure. These pins also work with the front UID indicator, which will activate as either a solid or flashing blue LED depending on whether the LED was activated via IPMI or the UID button. Refer to the tables on the right for pin definitions and status indicators.

**OH/Fan Fail/ PWR Fail/Blue_UID LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 7 | Blue_LED Cathode (UID) |
| 8 | OH/Fan Fail/PWR Fail/UID LED |

**OH/Fan Fail/PWR Fail LED Status**

| Pin 7 | Pin 8 | Red LED | Blue LED |
|---|---|---|---|
| Low | High | On: OH/FF/Pwr Fail (Solid On: OH Fast Blinking: Fan Fail Slow Blinking: Pwr Fail) | Off |
| High | Low | Off (System normal) | On UID LED |
| High | High | Off | Off |

### Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

**Power Fail LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 5 | Vcc |
| 6 | Ground |

### Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to the hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

**Reset Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 3 | Reset |
| 4 | Ground |

### Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (see the Power Button Mode setting in BIOS). To turn off the power when set to suspend mode, depress the button for at least 4 seconds. Refer to the table on the right for pin definitions.

**Power Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 1 | PW_ON |
| 2 | Ground |

### Fan Headers

The serverboard has six system/CPU fan headers (Fan 1~Fan 5, Fan A). All are 4-pin fans headers, which are backward compatible with traditional 3-pin fans. Fan speed control is available for 4-pin fans only. The fan speeds are controlled by IPMI. See the table on the right for pin definitions.

**Fan Header Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Ground |
| 2 | +12V |
| 3 | Tachometer |
| 4 | PWR Modulation |

### Chassis Intrusion

A Chassis Intrusion header is located at JL1. Attach an appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.

**Chassis Intrusion Pin Definitions**

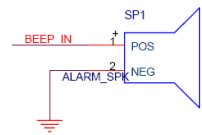
| Pin# | Definition |
|---|---|
| 1 | Intrusion Input |
| 2 | Ground |

### Internal Speaker

The Internal Speaker, located at SP1, can be used to provide audible indications for various beep codes. See the table on the right for pin definitions. Refer to the layout below for the locations of the Internal Buzzer (SP1).

**Internal Buzzer (SP1) Pin Definition**

| Pin# | | Definitions |
|---|---|---|
| Pin 1 | Pos. (+) | Beep In |
| Pin 2 | Neg. (-) | Alarm Speaker |




### Overheat/Fan Fail LED

The JOH1 header is used to connect an LED indicator to provide warnings of chassis overheating and fan failure. This LED will blink when a fan failure occurs. Refer to the tables on right for pin definitions.

**OH/Fan Fail LED Status**

| State | Message |
|---|---|
| Solid | Overheat |
| Blinking | Fan Fail |

### TPM Header/Port 80

A Trusted Platform Module/Port 80 header is located at JTPM1 to provide TPM support and Port 80 connection. Use this header to enhance system performance and data security. See the table on the right for pin definitions.

**TPM/Port 80 Header Pin Definitions**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | LCLK | 2 | GND |
| 3 | LFRAME# | 4 | <(KEY)> |
| 5 | LRESET# | 6 | +5V (X) |
| 7 | LAD 3 | 8 | LAD 2 |
| 9 | +3.3V | 10 | LAD1 |
| 11 | LAD0 | 12 | GND |
| 13 | SMB_CLK4 | 14 | SMB_DAT4 |
| 15 | +3V_DUAL | 16 | SERIRQ |
| 17 | GND | 18 | CLKRUN# (X) |
| 19 | LPCPD# | 20 | LDRQ# (X) |

## Standby Power Header

The Standby Power header is located at JSTBY1. See the table on the right for pin definitions. (You must also have a cable to use this feature.)

**Standby PWR Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | +5V Standby |
| 2 | Ground |
| 3 | Wake-up |

### Power SMB ($I^2C$) Connector

Power System Management Bus ($I^2C$) (connector at JPI$^2$C1) monitors power supply, fan and system temperatures. See the table on the right for pin definitions.

**PWR SMB Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Clock |
| 2 | Data |
| 3 | PWR Fail |
| 4 | Ground |
| 5 | +3.3V |

### IPMB

A System Management Bus header for IPMI 2.0 is located at JIPMB1. Connect the appropriate cable here to use the IPMB $I^2C$ connection on your system.

**IPMB Header Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Data |
| 2 | Ground |
| 3 | Clock |
| 4 | No Connection |

### T-SGPIO 1/2 Headers

Two SGPIO (Serial-Link General Purpose Input/Output) headers are located at J17 and J18. These headers support Serial Link interface for onboard SATA connections. See the table on the right for pin definitions.

**T-SGPIO Pin Definitions**

| Pin# | Definition | Pin | Definition |
|---|---|---|---|
| 1 | NC | 2 | NC |
| 3 | Ground | 4 | Data |
| 5 | Load | 6 | Ground |
| 7 | Clock | 8 | NC |

**Note:** NC indicates no connection.

### DOM Power Connector

A power connector for SATA DOM (Disk On Module) devices is located at JSD1. Connect an appropriate cable here to provide power support for your DOM devices.

**DOM PWR Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | +5V |
| 2 | Ground |
| 3 | Ground |

### RAIDKey Header

A RAIDKey header (JRK1) provides RAID function support to enhance system performance.

**RAIDKey Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Ground |
| 2 | Signal |
| 3 | Ground |

### LAN3/LAN4 LED Indicators

The NIC (Network Interface Controller) LED connections for LAN port 3 are located on pins 3 and 4 of JF2, and the LED connections for LAN port 4 is on pins 1 and 2 of JF2. Attach NIC LED cables here to display network activities. Refer to the table on the right for pin definitions.

**Note**: The NIC LED connections for LAN Ports 1/2 are located on JF1.

**LAN Ports 3/4 LED Indicators (JF2) Pin Definitions**

| Pin# | Definition | Pin | Definition |
|---|---|---|---|
| 1 | LAN4 Activity | 2 | LAN4 Link |
| 3 | LAN3 Activity | 4 | LAN3 Link |

### Unit Identifier Switch

The UID Switch is located next to the 10G LAN 4 port on the backplane. The rear UID LED (LE2) is located next to the UID Switch. The Front Panel UID LED is located at Pins 7/8 of the Front Control Panel at JF1. Connect a cable to Pin 8 on JF1 for Front Panel UID LED indication. When you press the UID switch, both Rear UID LED and Front Panel UID LED Indicators will be turned on. Press the UID switch again to turn off both LED Indicators. These UID Indicators provide easy identification of a system unit that may be in need of service.

**Note:** UID can also be triggered via IPMI on the serverboard. For more information on IPMI, please refer to the IPMI User's Guide posted on our Website @http://www.supermicro.com.

| UID Switch | |
|---|---|
| Pin# | Definition |
| 1 | Ground |
| 2 | Ground |
| 3 | Button In |
| 4 | Ground |

| UID LED (LE2) Status | | |
|---|---|---|
| Color/State | OS Status | |
| Blue: On | Windows OS | Unit Identified |
| Blue: Blinking | Linux OS | Unit Identified |

### Ethernet Ports

Two Gb LAN ports (LAN1/2) and two 10Gb LAN ports (LAN3/4) are located on the I/O backplane to provide Ethernet connections. LAN3/LAN4 ports support 1 Gb connections on the -3LN4F+, and 10 Gb connections on the -3TF+. In addition, a dedicated IPMI LAN, located above USB 0/1 ports on the backplane, provides KVM support for IPMI 2.0. All these ports accept RJ45 type cables.

### Serial Ports

Two COM connections (COM1 & COM2) are located on the serverboard. COM1 is located on the Backplane I/O panel. COM2, located close to USB 4/5 Connectors, is used to provide front access support. See the table on the right for pin definitions.

**Serial COM) Ports Pin Definitions**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | DCD | 6 | DSR |
| 2 | RXD | 7 | RTS |
| 3 | TXD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | Ground | 10 | N/A |

### ATX PS/2 Keyboard and Mouse Ports

The ATX PS/2 keyboard and PS/2 mouse are located next to the Back Panel USB Ports 0/1 and the IPMI LAN port on the serverboard. See the table at right for pin definitions.

**PS/2 Keyboard/Mouse Pin Definitions**

| PS2 Keyboard | | PS2 Mouse | |
|---|---|---|---|
| Pin# | Definition | Pin# | Definition |
| 1 | KB Data | 1 | Mouse Data |
| 2 | No Connection | 2 | No Connection |
| 3 | Ground | 3 | Ground |
| 4 | Mouse/KB VCC (+5V) | 4 | Mouse/KB VCC (+5V) |
| 5 | KB Clock | 5 | Mouse Clock |
| 6 | No Connection | 6 | No Connection |
| VCC: with 1.5A PTC (current limit) | | | |

### Universal Serial Bus (USB)

Two Universal Serial Bus ports (USB 0/1) are located on the I/O back panel. In addition, two USB headers, located close to the I-SATA ports, provide four front-accessible USB connections (USB 2/3, USB 4/5). A Type A connector (USB 6) also supports front panel USB connections. (Cables are not included). See the tables on the right for pin definitions.

**Backplane USB (USB 0/1) Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | +5V |
| 2 | PO- |
| 3 | PO+ |
| 4 | Ground |
| 5 | NA |

**FP USB (2/3, 4/5, 6) Pin Definitions**

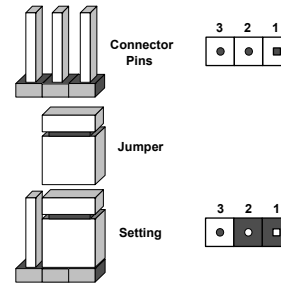
| USB 2, 4, 6 Pin # | Definition | USB 3, 5 Pin # | Definition |
|---|---|---|---|
| 1 | +5V | 1 | +5V |
| 2 | PO- | 2 | PO- |
| 3 | PO+ | 3 | PO+ |
| 4 | Ground | 4 | Ground |
| 5 | NC | 5 | Key |

(NC= No connection)

## 5-9 Jumper Settings

### Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the serverboard layout page for jumper locations.




**Note:** On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

### CMOS Clear

JBT1 is used to clear CMOS and will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

***To clear CMOS***

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

**Note:** *Do not use the PW_ON connector to clear CMOS.*

### VGA Enable/Disable

JPG1 allows you to enable or disable the onboard VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings. The default setting is enabled.

| VGA Enable/Disable Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### JPL1/JPL2

Use JPL1 to enable/disable LAN ports 1/2, and use JPL2 for LAN ports 3/4. See the table on the right for jumper settings. The default setting is Enabled.

| LAN Port Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### Watch Dog Enable/Disable

JWD1 controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application "hangs". Pins 1-2 will cause WD to reset the system if an application hangs. Pins 2-3 will generate a non-maskable interrupt signal for the application that has hung. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

| Watch Dog Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Reset |
| Pins 2-3 | NMI |
| Open | Disabled |

### SMB to PCI Express Slots

Jumpers JI$^2$C1 and JI$^2$C2 allow you to connect the System Management Bus (I$^2$C) to the PCI Express slots. Both jumpers must have the same setting to function correctly. The default setting is disabled. See the table on the right for jumper settings.

| SMB to PCI-Exp Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Closed | Enabled |
| Open | Disabled |

### BMC Enable

Jumper JPB1 allows you to enable the embedded the Nuvoton BMC (Baseboard Management) Controller to provide IPMI 2.O/KVM support on the serverboard. See the table on the right for jumper settings.

| BMC Enable Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | BMC Enable |
| Pins 2-3 | Normal (Default) |

## 5-10 Onboard Indicators

### LAN LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each Gigabit LAN port, one LED indicates activity when blinking while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for details on the connection speed LED.

| LAN LED Connection Speed Indicator | |
|---|---|
| LED Color | Definition |
| Off | No connection or 10 Mb/s |
| Green | 100 Mb/s |
| Amber | 1 Gb/s |

### Dedicated IPMI LAN LEDs

In addition to LAN1 and LAN2, a dedicated IPMI LAN is located on the I/O backpanel. The amber LED indicates activity, while the Link LED indicates the speed of the connection. See the tables at right for more information.

| IPMI LAN Activity Indicator | | |
|---|---|---|
| Color | Status | Definition |
| Amber | Flashing | Active |

| IPMI LAN Indicator | |
|---|---|
| LED Color | Definition |
| Off | No Connection or 10 Mb/s |
| Green | 100 Mb/s |

### LE1

An Onboard Power LED is located at LE1. When this LED is lit the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components.

| Onboard PWR LED Indicator | |
|---|---|
| LED Color | Definition |
| Off | System Off/Power cable not connected |
| Green | System On |

### Rear UID LED

The rear UID LED is located at the I/O backplane. This LED is used in conjunction with the rear UID switch to provide easy identification of a system that might be in need of service.

| UID LED | | |
|---|---|---|
| Color/State | OS | Status |
| Blue: On | Windows | Unit Identified |
| Blue: Blinking | Linux | Unit Identified |

### BMC Heartbeat LED

A BMC Heartbeat LED is located at LEM1. When LEM1 is blinking, BMC is functioning normally.

| BMC Heartbeat LED Status | |
|---|---|
| Color/State | Definition |
| Green: Blinking | BMC: Normal |

## 5-11 SAS/SATA Port Connections

### SATA Ports

There are six Serial ATA Ports (I-SATA0~I-SATA 5) located on the serverboard, including four SATA2 ports and two SATA3 ports. See the table on the right for pin definitions.

**SATA Port Pin Definitions**

| Pin # | Definition |
|---|---|
| 1 | Ground |
| 2 | TXP |
| 3 | TXN |
| 4 | Ground |
| 5 | RXN |
| 6 | RXP |
| 7 | Ground |

### SAS Ports

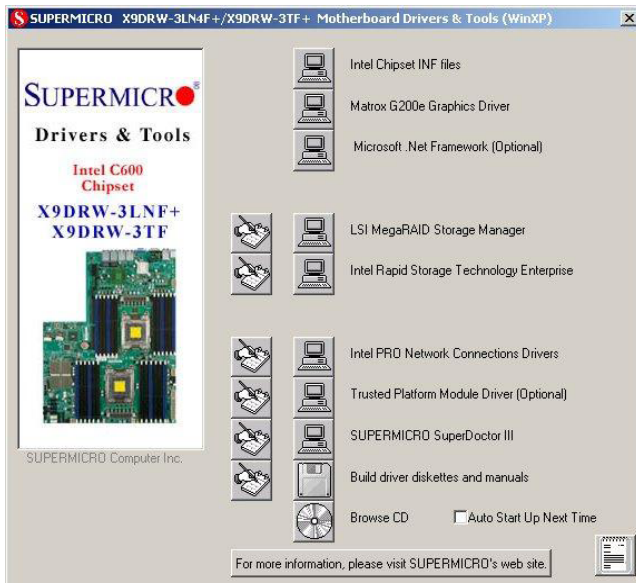
Eight Serial Attached SCSI Ports (SAS 0~3, 4~7) are provided on the serverboard to provide serial link connections. These ports are supported by the Intel PCH C608 Controller. See the table on the right for pin definitions.

**SAS Port Pin Definitions**

| Pin # | Definition |
|---|---|
| 1 | Ground |
| 2 | TXP |
| 3 | TXN |
| 4 | Ground |
| 5 | RXN |
| 6 | RXP |
| 7 | Ground |

## 5-12 Installing Software

After the hardware has been installed, you should first install the operating system and then the drivers. The necessary drivers are all included on the Supermicro CDs that came packaged with your serverboard.




**Driver/Tool Installation Display Screen**

**Note:** Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents of the CD.

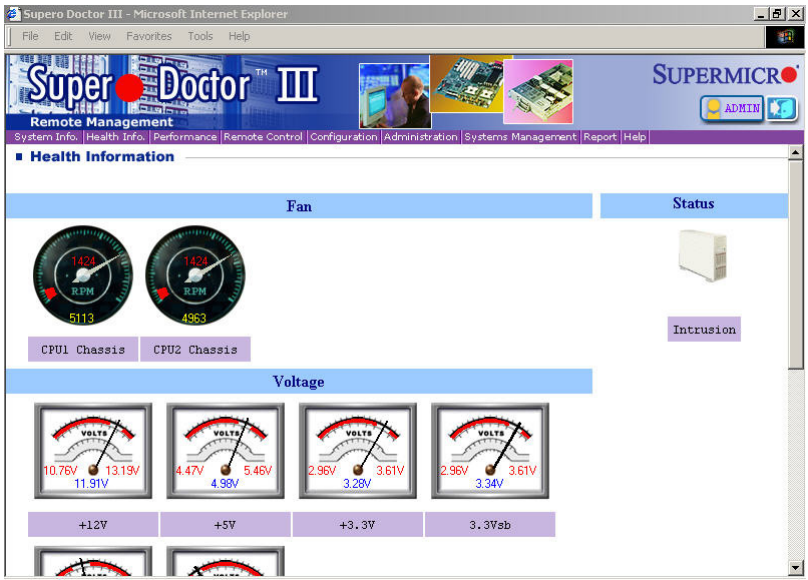
### Supero Doctor III

The Supero Doctor III program is a Web base management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called SD III Client. The Supero Doctor III program included on the CDROM that came with your serverboard allows you to monitor the environment and operations of your system. Supero Doctor III displays crucial system information such as CPU temperature, system voltages and fan status. See the Figure below for a display of the Supero Doctor III interface.

**Note:** The default User Name and Password for SuperDoctor III is ADMIN / ADMIN.

**Note:** When SuperDoctor III is first installed, it adopts the temperature threshold settings that have been set in BIOS. Any subsequent changes to these thresholds must be made within Super Doctor, as the Super Doctor settings override the BIOS settings. To set the BIOS temperature threshold settings again, you would first need to uninstall SuperDoctor III.

**Supero Doctor III Interface Display Screen (Health Information)**



**Supero Doctor III Interface Display Screen (Remote Control)**

Supero Doctor III - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Super Doctor III
Remote Management
SUPERMICRO
ADMIN
System Info. Health Info. Performance Remote Control Configuration Administration Systems Management Report Help
Remote Control
Graceful Power Control
Open Console
Power Control
Enter
Comm.
Graceful power control
Supero Doctor III allows a user to inform the OS to reboot or shut down within a specified time (the default is 30 seconds). Before the system reboots or shuts down, it's allowed to cancel the action.
Requirements
Keep Supero SD3Service Daemon running at all times on this system.
Provide TCP/IP connectivity.
Power control

Note: SD III Software Revision 1.0 can be downloaded from our Web Site at: ftp://ftp.supermicro.com/utility/Supero_Doctor_III/. You can also download SDIII User's Guide at: http://www.supermicro.com/manuals/other/SDIII_User_Guide.pdf. For Linux, we will still recommend Supero Doctor II.

## Notes

# Chapter 6

# Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC829BTQ chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the next step.

**Tools Required:** The only tool you will need to install components and perform maintenance is a Philips screwdriver.

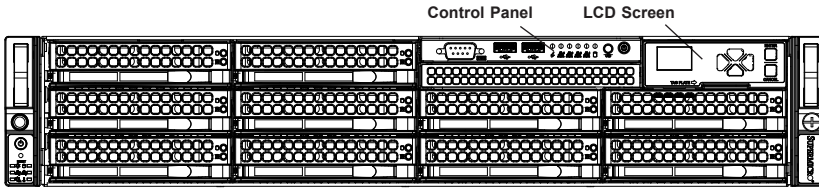
## 6-1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD damage.

### Precautions

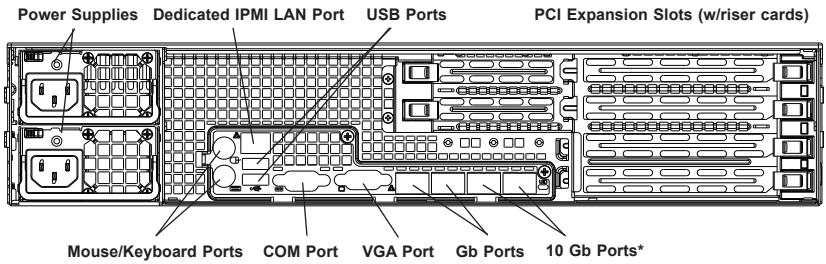
- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

**Figure 6-1. Chassis: Front and Rear Views**




**Hard Drive Bays (10)**

| Drive Configuration | | | |
|---|---|---|---|
| SAS2 | SAS5 | | |
| SAS1 | SAS4 | SAS7 | SATA1 |
| SAS0 | SAS3 | SAS6 | SATA0 |




*6027R-N3RFT+ only.

## 6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. These wires have been bundled together as a ribbon cable to simplify the connection. Connect the cable from JF1 on the serverboard to the appropriate header on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path.

The control panel LEDs inform you of system status. See "Chapter 3: System Interface" for details on the LEDs and the control panel buttons. Details on JF1 can be found in "Chapter 5: Advanced Serverboard Setup."

## 6-3 Accessing the Inside of the System

1. If rack mounted, first, grasp the two handles on either side and pull the system straight out until it locks (you will hear a "click").

2. Remove the two screws on each side of the cover, which secure the cover to the chassis.

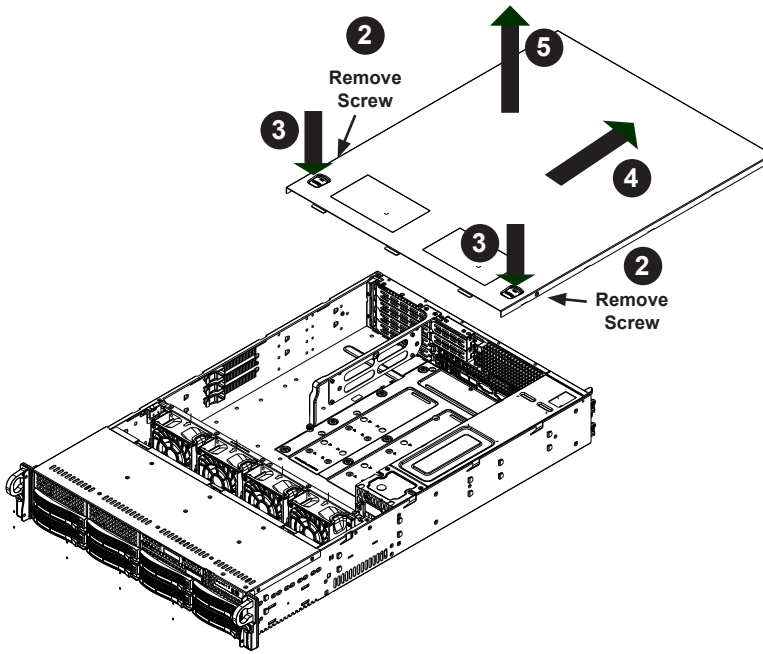
3. Press the release tabs to remove the cover from the locked position. Press both tabs at the same time.

4. Once the top cover is released from the locked position, slide the cover toward the rear of the chassis.

5. Lift the cover off the chassis.

6. To remove the system from the rack completely, press the locking tabs in the chassis rails (push the right-side tab down and the left-side tab up) to continue to pull the system out past the locked position. See Figure 6-2

**Figure 6-2. Accessing the Inside of the System**



## 6-4 System Fans

The SC829BTQ chassis contains four 8-cm high-performance fans.

### System Fan Failure

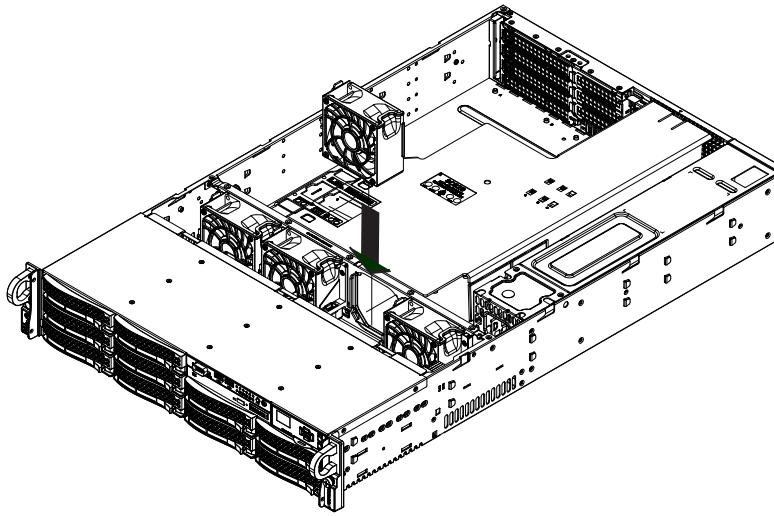
Fan speed is controlled by system temperature via IPMI. If a fan fails, the remaining fan will ramp up to full speed and the overheat/fan fail LED on the control panel will turn on. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan).

Remove the top chassis cover while the system is still running to determine which of the fans has failed. Then power down the system before replacing a fan. Removing the power cord(s) is also recommended as a safety precaution.

***Replacing System Fans***

1. After determining which fan has failed, turn off the system power.
2. Unplug the fan wiring from the serverboard and remove the failed fan.
3. Press the fan release tab to lift the failed fan from the chassis and pull it completely from the chassis.
4. Place the new fan into the vacant space in the housing while making sure the arrows on the top of the fan (indicating air direction) point in the same direction as the arrows on the other fans.
5. Power up the system and check that the fan is working properly before replacing the chassis cover.

**Figure 6-3. System Fans**



## Air Shroud

Air shrouds concentrate airflow to maximize fan efficiency. The SC829B chassis air shroud does not require screws to set up.

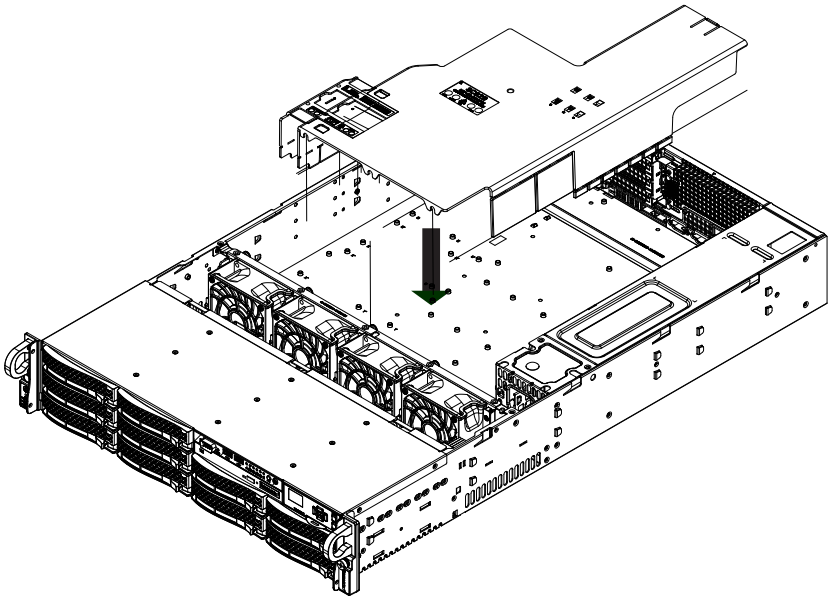
***Installing the Air Shroud***

1. Confirm that your air shroud matches your chassis model. Each shroud is labeled SC829B (part number MCP-310-29002-0N).

2. Place air shroud in the chassis. The air shroud fits behind the two fans closest to the power supply.

For ordering information, visit the Supermicro website at www.supermicro.com and click on the Where to Buy link.

**Figure 6-4. Air Shroud Installation**



## Accessing the Drive Bays

Hard Drives: Because of their hot-swap capability, you do not need to access the inside of the chassis or power down the system to install or replace the hard drives. Proceed to the next section for instructions.

DVD-ROM Drive: For installing/removing a DVD-ROM drive, you will need to gain access to the inside of the server by removing the top cover of the chassis. Proceed to the "DVD-ROM Drive Installation" section later in this chapter for instructions.

**Note:** Only a "slim" DVD-ROM drive will fit into the 6027R-N3RF4+/6027R-N3RFT+.

## Hard Drive Installation

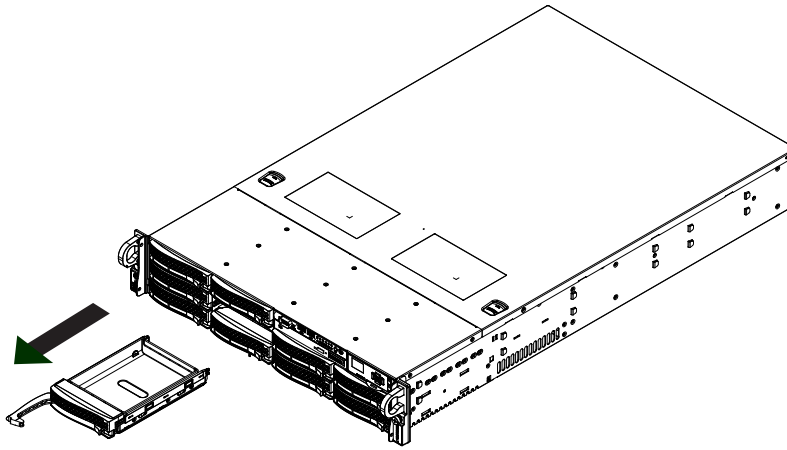
The SC829B chassis accepts eight hot-swappable 3.5" hard drives. The hard drives are mounted in drive carriers to simplify their installation and removal from the chassis. System power may remain on when removing carriers with drives installed. These carriers also help promote proper airflow for the drive bays. For this reason, even empty carriers without drives installed must remain in the chassis.

***Removing Hard Drive Carrier from the Chassis***

1. Press the release button on the drive carrier. This extends the drive carrier handle.

2. Use the handle to pull the drive out of the chassis.

**Figure 6-5. Removing a Drive from the Server**



***Installing a Hard Drive into a Drive Carrier***

1. Remove the screws securing the dummy drive to the carrier.
2. Remove the dummy drive from the carrier.
3. Install a new drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.
4. Secure the hard drive by tightening all six screws.
5. Replace the drive carrier into the chassis bay, making sure that the drive carrier handle is completely closed.

Warning: Except for short periods of time (swapping hard drives), do not operate the server with the hard drives removed from the bays.

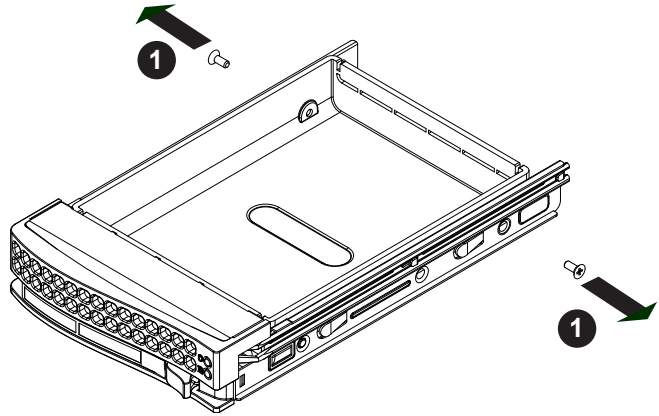



**Figure 6-6. Removing a Dummy Drive from a Carrier**

6. Install a new drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.
7. Secure the hard drive by tightening all six screws.
8. Replace the drive carrier into the chassis bay, making sure that the drive carrier handle is completely closed.

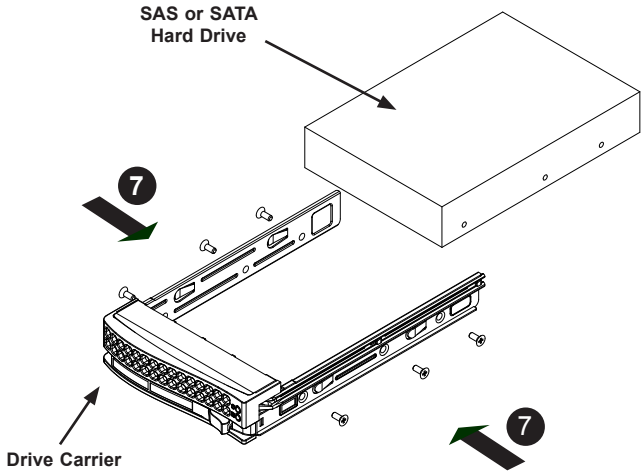



**Figure 6-7. Installing a Hard Drive**

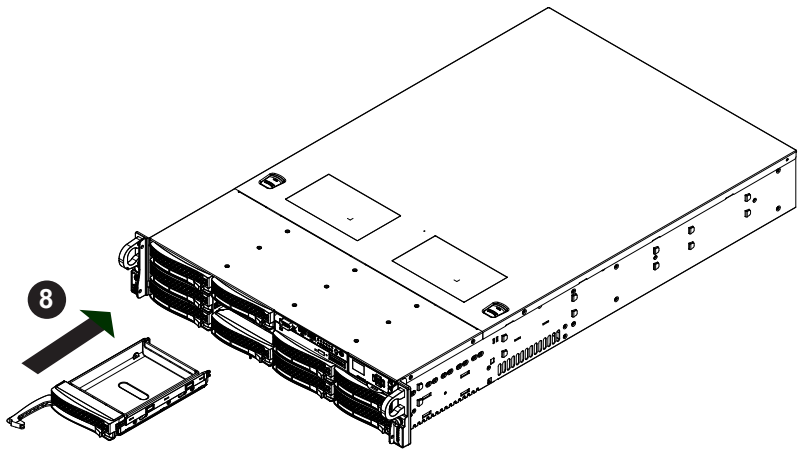



**Figure 6-8. Installing a Carrier into its Bay**

**Warning!** Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, visit the Supermicro Web site at http://www.supermicro.com/products/nfo/storage.cfm

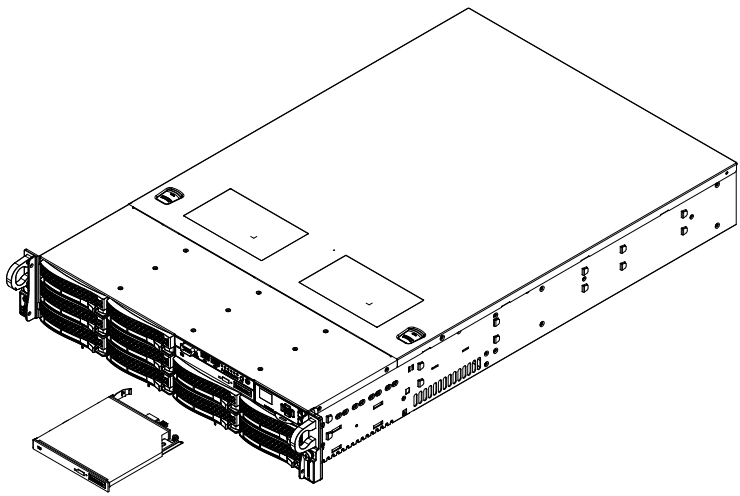
## 6-5 DVD-ROM Replacement or Installation

The SC829B chassis can have an optional DVD-ROM drive installed.

***Installing or Replacing a DVD-ROM Drive***

1. Power down the system and if necessary, remove the server from the rack.
2. Remove the chassis cover.
3. Unplug the drives power and data cables from the motherboard and/or backplane.
4. **If you are adding a new DVD-ROM drive:** Remove the mini-bezel (grate) from the drive bay The bezel can be removed by pulling out the hard drive beneath the DVD-ROM drive bay, then pulling the mini-bezel forward.
   **If you are replacing a drive:** Locate the locking tab at the rear (left hand side when viewed from the front) of the DVD-ROM drive. Push the tab toward the drive and push the drive unit out the front of the chassis.
5. Insert the new drive unit in the slot until the tab locks in place.
6. Reconnect the data and power cables.
7. Replace the chassis cover (replace the server in the rack, if necessary) and power up the system.

**Figure 6-9. Installing or Replacing a DVD-ROM Drive**



## 6-6 Power Supply

The SuperServer 6027R-N3RF4+/6027R-N3RFT+ has a 920 watt redundant power supply consisting of two power modules. Each power supply module has an auto-switching capability, which enables it to automatically sense and operate at a 100V - 240V input voltage.

### Power Supply Failure

If either of the two power supply modules fail, the other module will take the full load and allow the system to continue operation without interruption. The PWR Fail LED will illuminate and remain on until the failed unit has been replaced. Replacement units can be ordered directly from Supermicro. The power supply units have a hot-swap capability, meaning you can replace the failed unit without powering down the system.

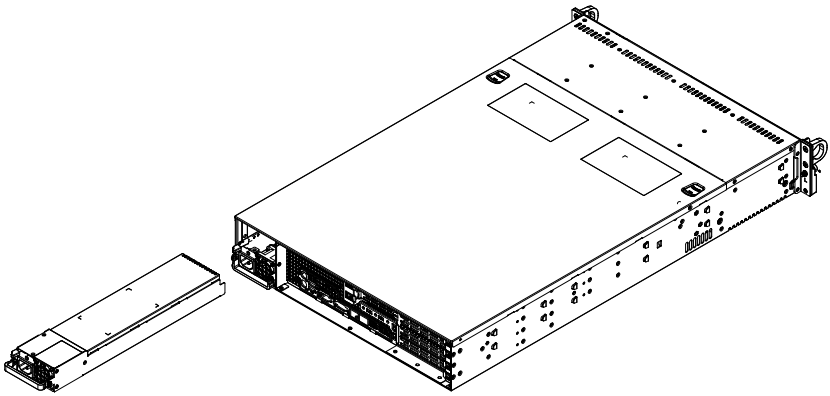
***Removing the Power Supply***

1. First unplug the AC power cord from the failed power supply module.
2. Depress the release tab on the power supply module as illustrated.
3. Use the handle to pull the module straight out of the chassis.

***Installing a New Power Supply***

1. Replace the failed hot-swap unit with another identical power supply unit.
2. Push the new power supply unit into the power bay until you hear a click.
3. Plug the AC power cord back into the unit and power up the server..

**Figure 6-10. Removing/Replacing the Power Supply**



# Chapter 7

# BIOS

## 7-1 Introduction

This chapter describes the AMI BIOS Setup utility for the X9DRW-3LN4F+/X9DRW-3TF+. It also provides the instructions on how to navigate the AMI BIOS Setup utility screens. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated.

### Starting BIOS Setup Utility

To enter the AMI BIOS Setup utility screens, press the <Del> key while the system is booting up.

**Note**: In most cases, the <Del> key is used to invoke the AMI BIOS setup screen. There are a few cases when other keys are used, such as <F3>, <F4>, etc.

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

**Note**: The AMI BIOS has default text messages built in. The manufacturer retains the option to include, omit, or change any of these text messages.

The AMI BIOS Setup utility uses a key-based navigation system called "hot keys." Most of the AMI BIOS setup utility "hot keys" can be used at any time during setup navigation. These keys include <F3>, <F4>, <Enter>, <ESC>, arrow keys, etc.

**Note 1**: Options printed in **Bold** are default settings.

**Note 2**: <F3> is used to load optimal default settings. <F4> is used to save the settings and exit the setup utility.

### How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS Setup utility. This Setup utility can be accessed by pressing <F2> at the appropriate time during system boot.

**Note**: For AMI UEFI BIOS Recovery, please refer to the UEFI BIOS Recovery User Guide posted @http://www.supermicro.com/support/manuals/.

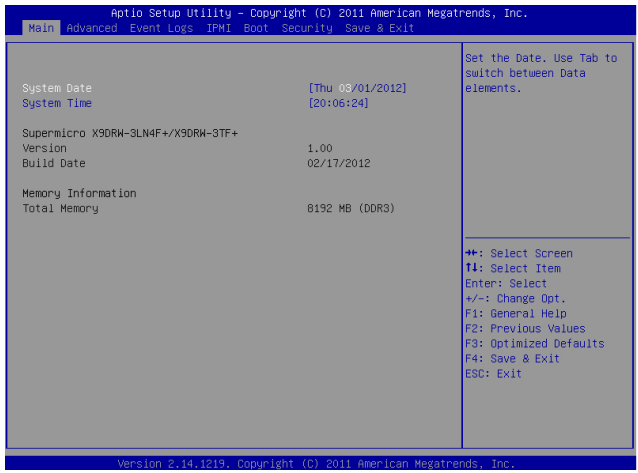
### Starting the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <F2> key to enter the main menu of the AMI BIOS Setup utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

**Warning!** Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall the manufacturer be liable for direct, indirect, special, incidental, or consequential damage arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is being updated to avoid possible boot failure.

## 7-2 Main Setup

When you first enter the AMI BIOS Setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Event Logs IPMI Boot Security Save & Exit
System Date [Thu 03/01/2012]
System Time [20:06:24]
Supermicro X9DRW-3LN4F+/X9DRW-3TF+
Version 1.00
Build Date 02/17/2012
Memory Information
Total Memory 8192 MB (DDR3)
Set the Date. Use Tab to switch between Data elements.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

The AMI BIOS main menu displays the following information:

**System Date**

This item displays the system date in Day MM/DD/YY format (e.g. Wed 10/12/2011).

**System Time**

This item displays the system time in HH:MM:SS format (e.g. 15:32:52).

**Supermicro X9DRW-3LN4F+/X9DRW-3TF+**

**Version**

This item displays the SMC version of the BIOS ROM used in this system.

**Build Date**

This item displays the date that the BIOS Setup utility was built.

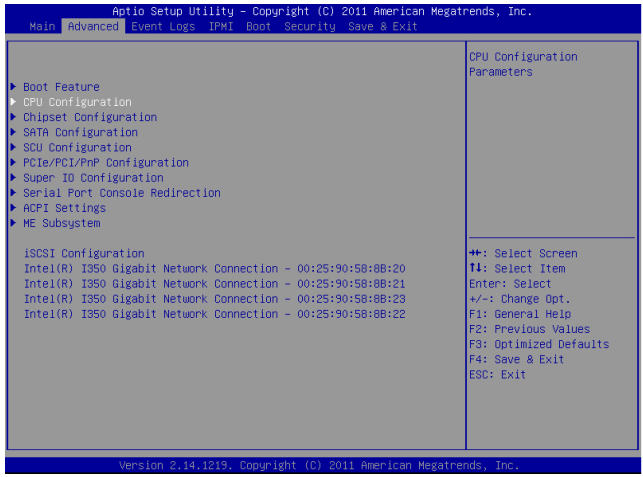
**Memory Information**

**Total Memory**

This displays the amount of memory that is available in the system.

## 7-3 Advanced Setup Configurations

Use the arrow keys to select Advanced and press <Enter> to access the following submenu items.




### ▶Boot Features

#### Quiet Boot

This feature allows the user to select bootup screen display between POST messages and the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

#### AddOn ROM Display Mode

Use this item to set the display mode for the Option ROM. Select Keep Current to use the current AddOn ROM Display setting. Select Force BIOS to use the Option ROM display mode set by the system BIOS. The options are **Force BIOS** and Keep Current.

#### Bootup Num-Lock

Use this feature to set the Power-on state for the Numlock key. The options are Off and **On**.

#### Wait For 'F1' If Error

Select Enabled to force the system to wait until the 'F1' key is pressed if an error occurs. The options are Disabled and **Enabled**.

**Interrupt 19 Capture**

Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are **Enabled** and Disabled.

## Power Configuration

**Watch Dog Function**

If enabled, the Watch Dog timer will allow the system to reboot when it is inactive for more than 5 minutes. The options are Enabled and **Disabled.**

**Power Button Function**

If this feature is set to Instant Off, the system will power off immediately as soon as the user presses the power button. If this feature is set to 4 Seconds Override, the system will power off when the user presses the power button for 4 seconds or longer. The options are **Instant Off** and 4 Seconds Override.

**Restore on AC Power Loss**

Use this feature to set the power state after a power outage. Select Stay Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last state before a power loss. The options are Power On, Stay Off, and **Last State**.

## ▶CPU Configuration

This submenu displays the information of the CPU as detected by the BIOS. It also allows the user to configuration CPU settings.

## ▶Socket 1 CPU Information/Socket 2 CPU Information

This submenu displays the following information regarding the CPUs installed in Socket 1/ Socket 2.

- Type of CPU
- CPU Signature
- Microcode Patch

- CPU Stepping
- Maximum CPU Speed
- Minimum CPU Speed
- Processor Cores
- Intel HT (Hyper-Threading) Technology
- Intel VT-x Technology
- Intel SMX Technology
- L1 Data Cache
- L1 Code Cache
- L2 Cache
- L3 Cache

**CPU Speed**

This item displays the speed of the CPU installed in Socket 1/Socket 2.

**64-bit**

This item indicates if the CPU installed in Socket 1 or Socket 2 supports 64-bit technology.

**Clock Spread Spectrum**

Select Enable to enable Clock Spectrum support, which will allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disabled** and Enabled.

**RTID (Record Types IDs)**

This feature displays the total number of Record Type IDs for local and remote pools. The options are **Optimal** and Alternate.

**Hyper-threading**

Select Enabled to support Intel Hyper-threading Technology to enhance CPU performance. The options are **Enabled** and Disabled.

**Active Processor Cores**

Set to Enabled to use a processor's second core and above. (Please refer to Intel's website for more information.) The options are **All,** 1, 2, 4 and 6.

**Limit CPUID Maximum**

This feature allows the user to set the maximum CPU ID value. Enable this function to boot the legacy operating systems that cannot support processors with extended CPUID functions. The options are Enabled and **Disabled** (for the Windows OS).

**Execute-Disable Bit (Available if supported by the OS & the CPU)**

Select Enabled to enable the Execute Disable Bit which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damage the system during an attack. The default is **Enabled**. (Refer to Intel and Microsoft Web sites for more information.)

**Intel® AES-NI**

Select Enable to use the Intel Advanced Encryption Standard (AES) New Instructions (NI) to ensure data security. The options are **Enabled** and Disabled.

**MLC Streamer Prefetcher (Available when supported by the CPU)**

If set to Enabled, the MLC (mid-level cache) streamer prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache to improve CPU performance. The options are Disabled and **Enabled**.

**MLC Spatial Prefetch (Available when supported by the CPU)**

If this feature is set to Disabled, The CPU prefetches the cache line for 64 bytes. If this feature is set to Enabled the CPU fetches both cache lines for 128 bytes as comprised. The options are Disabled and **Enabled**.

**DCU Streamer Prefetcher (Available when supported by the CPU)**

Select Enabled to support Data Cache Unite (DCU) prefetch of L1 data to speed up data accessing and processing in the DCU to enhance CPU performance. The options are Disabled and **Enabled**.

**DCU IP Prefetcher**

Select Enabled for DCU (Data Cache Unit) IP Prefetcher support, which will prefetch IP addresses to improve network connectivity and system performance. The options are **Enabled** and Disabled.

**Intel® Virtualization Technology (Available when supported by the CPU)**

Select Enabled to support Intel Virtualization Technology, which will allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and Disabled.

**Note**: If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's website for detailed information.)

## ▶ CPU Power Management Configuration

This submenu allows the user to configure the following CPU Power Management settings.

**Power Technology**

Select Energy Efficiency to support power-saving mode. Select Custom to customize system power settings. Select Disabled to disable power-saving settings. The options are Disabled, **Energy Efficiency**, and Custom. If the option is set to Custom, the following items will display:

**EIST (Available when Power Technology is set to Custom)**

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency to reduce power consumption and heat dissipation. The options are Disabled (GV3 Disabled), and **Enabled (GV3 Enabled)**. (**Note**: GV3 is Intel Speedstep support used on older platforms. Please refer to Intel's website for detailed information.)

**Turbo Mode (Available when Power Technology is set to Custom)**

Select Enabled to use the Turbo Mode to boost system performance. The options are **Enabled** and Disabled.

**C1E (Available when Power Technology is set to Custom)**

Select Enabled to enable Enhanced C1 Power State to boost system performance. The options are **Enabled** and Disabled.

**CPU C3 Report (Available when Power Technology is set to Custom)**

Select Enabled to allow the BIOS to report the CPU C3 State (ACPI C2) to the operating system. During the CPU C3 State, the CPU clock generator is turned off. The options are Enabled and **Disabled.**

**CPU C6 Report (Available when Power Technology is set to Custom)**

Select Enabled to allow the BIOS to report the CPU C6 State (ACPI C3) to the operating system. During the CPU C6 State, the power to all cache is turned off. The options are **Enabled** and Disabled.

**CPU C7 Report (Available when Power Technology is set to Custom)**

Select Enabled to allow the BIOS to report the CPU C7 State (ACPI C3) to the operating system. CPU C7 State is a processor-specific low C-State. The options are **Enabled** and Disabled.

**Package C-State limit (Available when Power Technology is set to Custom)**

This feature allows the user to set the limit on the C-State package register. The options are C0, C2, **C6,** and No Limit.

**Energy Performance Bias**

This setting allows the user to adjust the fan speed based on performance (maximum cooling) or energy efficiency (maximum energy savings). The options are Performance, **Balanced Performance**, Balanced Energy, and Energy Efficient.

**Factory Long Duration Power Limit**

This item displays the power limit set by the manufacturer during which long duration power is maintained.

**Long Duration Power Limit**

This item displays the power limit set by the user during which long duration power is maintained.

**Factory Long Duration Maintained (Available when Power Technology is set to Custom)**

This item displays the period of time set by the manufacturer during which long duration power is maintained.

**Long Duration Maintained**

This item displays the period of time during which long duration power is maintained.

**Recommended Short Duration Power**

This item displays the short duration power settings recommended by the manufacturer.

**Short Duration Power Limit**

This item displays the time period during which short duration power is maintained.

## ▶Chipset Configuration

## ▶North Bridge

This feature allows the user to configure the settings for the Intel North Bridge.

### ▶Integrated IO Configuration

**Intel VT-d**

Select Enabled to enable Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VWM (Virtual Working Memory) through the DMAR ACPI Tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enabled** and Disabled.

**Data Direct I/O**

Select Enabled to enable Intel I/OAT (I/O Acceleration Technology), which significantly reduces CPU overhead by leveraging CPU architectural improvements and freeing the system resource for other tasks. The options are Disabled and **Enabled**.

**DCA Support**

Select Enabled to use Intel's DCA (Direct Cache Access) Technology to improve data transfer efficiency. The options are **Enabled** and Disabled.

**IIO 1 PCIe Port Bifurcation Control**

This submenu configures the following IO PCIe Port Bifurcation Control settings for IIO 1 PCIe ports to determine how the available PCI-Express lanes to be distributed between the PCI-Exp. Root Ports.

**IOU2-PCIe Port**

This feature allows the user to set the bus speed between the IOU2 and the PCI-Exp port. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, **Auto**.

**IOU3-PCIe Port**

This feature allows the user to set the bus speed between the IOU3 and the PCI-Exp port. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

**IIO 2 PCIe Port Bifurcation Control**

This submenu configures the following IO PCIe Port Bifurcation Control settings for IIO 2 PCIe ports to determine how the available PCI-Express lanes to be distributed between the PCI-Exp. Root Ports.

**IOU2-PCIe Port**

This feature allows the user to set the bus speed between the IOU2 and the PCI-Exp port. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, **Auto**.

**IOU3-PCIe Port**

This feature allows the user to set the bus speed between the IOU3 and the PCI-Exp port. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

## ▶QPI Configuration

**Current QPI Link**

This item displays the current status of the QPI Link.

**Current QPI Frequency**

This item displays the frequency of the QPI Link.

**Isoc**

Select Enabled to enable Ischronous support to meet QoS (Quality of Service) requirements. This feature is especially important for virtualization technology. The options are Enabled and **Disabled**.

**QPI (Quick Path Interconnect) Link Speed Mode**

Use this feature to select data transfer speed for QPI Link connections. The options are **Fast** and Slow.

**QPI Link Frequency Select**

Use this feature to select the desired QPI frequency. The options are **Auto**, 6.4 GT/s, 7.2 GT/s, and 8.0 GT/s.

### ▶DIMM Configuration

This section displays the following DIMM information.

**Current Memory Mode**

This item displays the current memory mode.

**Current Memory Speed**

This item displays the current memory speed.

**Mirroring**

This item displays if memory mirroring is supported by the motherboard. Memory mirroring creates a duplicate copy of the data stored in the memory to enhance data security.

**Sparing**

This item displays if memory sparing is supported by the motherboard. Memory sparing enhances system performance.

**▶DIMM Information**

**CPU Socket 1 DIMM Information/ CPU Socket 2 DIMM Information**

The status of the memory modules detected by the BIOS will be displayed as detected by the BIOS.

**Memory Mode**

When Independent is selected, all DIMMs are available to the operating system. When Mirroring is selected, the motherboard maintains two identical copies of all data in memory for data backup. When Lockstep is selected, the motherboard uses two areas of memory to run the same set of operations in parallel. The options are **Independent**, Mirroring, and Lockstep.

**DRAM RAPL Mode**

RAPL (Running Average Power Limit) provides mechanisms to enforce power consumption limits on supported processors The options are DRAM RAPL MODE0 , **DRAM RAPL MODE1**, and Disabled.

**DDR Speed**

Use this feature to force a DDR3 memory module to run at a frequency other than what is specified in the specification. The options are **Auto**, Force DDR3-800, Force DDR3-1066, Force DDR3-1333, Force DDR3-1600 and Force SPD.

**Channel Interleaving**

This feature selects from the different channel interleaving methods. The options are **Auto**, 1 Way, 2 Way, 3, Way, and 4 Way.

**Rank Interleaving**

This feature allows the user to select a rank memory interleaving method. The options are **Auto**, 1 Way, 2 Way, 4, Way, and 8 Way.

**Patrol Scrub**

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction to the requestor (the original source). When this item is set to Enabled, the IO hub will read and write back one cache line every 16K cycles, if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the IO hub will be scrubbed every day. The options are **Enabled** and Disabled.

**Demand Scrub**

Demand Scrubbing is a process that allows the CPU to correct correctable memory errors found on a memory module. When the CPU or I/O issues a demand-read command, and the read data from memory turns out to be a correctable error, the error is corrected and sent to the requestor (the original source). Memory is updated as well. Select Enabled to use Demand Scrubbing for ECC memory correction. The options are Enabled and **Disabled**.

**Data Scrambling**

Select Enabled to enable data scrambling to ensure data security and integrity. The options are Disabled and **Enabled**.

**Device Tagging**

Select Enabled to support device tagging. The options are **Disabled** and Enabled.

**Thermal Throttling**

Throttling improves reliability and reduces power consumption in the processor via automatic voltage control during processor idle states. The options are Disabled and **CLTT** (Closed Loop Thermal Throttling).

## ▶South Bridge Configuration

This feature allows the user to configure the settings for the Intel PCH chip.

**PCH Information**

This feature displays the following PCH information.

**Name**: This item displays the name of the PCH chip.

**Stepping**: This item displays the status of the PCH stepping.

**USB Devices**: This item displays the USB devices detected by the BIOS.

**All USB Devices**

This feature enables all USB ports/devices. The options are Disabled and **Enabled**. (If set to Enabled, EHCI Controller 1 and Controller 2 will appear.)

**EHCI Controller 1/EHCI Controller 2 (Available when All USB Devices is set to Enabled)**

Select Enabled to enable EHCI (Enhanced Host Controller Interface) Controller 1 or Controller 2. The options are Disabled and **Enabled**.

**Legacy USB Support (Available when USB Functions is not Disabled)**

Select Enabled to support legacy USB devices. Select Auto to disable legacy support if USB devices are not present. Select Disable to have USB devices available for EFI (Extensive Firmware Interface) applications only. The settings are Disabled, **Enabled** and Auto.

**Port 60/64 Emulation**

Select Enabled to enable I/O port 60h/64h emulation support for the legacy USB keyboard so that it can be fully supported by the operating systems that does not recognize a USB device. The options are Disabled and **Enabled**.

**EHCI Hand-Off**

This item is for operating systems that do not support Enhanced Host Controller Interface (EHCI) hand-off. When enabled, EHCI ownership change will be claimed by the EHCI driver. The options are **Disabled** and Enabled.

## ▶SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of IDE or SATA devices and displays the following items.

**SATA Port0~SATA Port5**: The AMI BIOS displays the status of each SATA port as detected by the BIOS.

**SATA Mode**

Use this feature to configure SATA mode for a selected SATA port. The options are Disabled, IDE Mode, **AHCI Mode** and RAID Mode. The following are displayed depending on your selection:

**IDE Mode**

The following items are displayed when IDE Mode is selected:

**Serial-ATA (SATA) Controller 0~1**

Use this feature to activate or deactivate the SATA controller, and set the compatibility mode. The options are Disabled, Enhanced, and Compatible. The default for Controller 0 is **Compatible.** The default of SATA Controller 1 is **Enhanced**.

**AHCI Mode**

The following items are displayed when the AHCI Mode is selected.

**Aggressive Link Power Management**

Select Enabled to enable Aggressive Link Power Management support for Cougar Point B0 stepping and beyond. The options are **Enabled** and Disabled.

**Port 0~5 Hot Plug**

Select Enabled to enable hot-plug support for a particular port, which will allow the user to change a hardware component or device without shutting down the system. The options are **Enabled** and Disabled.

**Staggered Spin Up**

Select Enabled to enable Staggered Spin-up support to prevent excessive power consumption caused by multiple HDDs spinning-up simultaneously. The options are Enabled and **Disabled**.

**RAID Mode**

The following items are displayed when RAID Mode is selected:

**Port 0~5 Hot Plug**

Select Enabled to enable hot-plug support for the particular port. The options are **Enabled** and Disabled.

## ▶SCU (Storage Control Unit) Configuration

**Storage Controller Unit**

Select Enabled to enable PCH SCU storage devices. The options are Disabled and **Enabled**.

**OnChip SCU Option ROM**

Select Enabled to support the onboard SCU Option ROM to boot up the system via a storage device. The options are Disabled and **Enabled**.

**SCU Port 0~SCU Port 7**: The AMI BIOS will automatically detect the onboard SCU devices and display the status of each SCU device as detected.

## ▶PCIe/PCI/PnP Configuration

**PCI ROM Priority**

Use this feature to select the Option ROM to boot the system when there are multiple Option ROMs available in the system. The options are EFI Compatible ROM and **Legacy ROM**.

**PCI Latency Timer**

Use this feature to set the latency Timer of each PCI device installed on a PCI bus. Select 64 to set the PCI latency to 64 PCI clock cycles. The options are 32, **64**, 96, 128, 160, 192, 224 and 248.

**Above 4G Decoding (Available if the system supports 64-bit PCI decoding)**

Select Enabled to decode a PCI device that supports 64-bit in the space above 4G Address. The options are Enabled and **Disabled**.

**PERR# Generation**

Select Enabled to allow a PCI device to generate a PERR number for a PCI Bus Signal Error Event. The options are Enabled and **Disabled**.

**SERR# Generation**

Select Enabled to allow a PCI device to generate an SERR number for a PCI Bus Signal Error Event. The options are Enabled and **Disabled**.

**Maximum Payload**

Select Auto to allow the system BIOS to automatically set the maximum payload value for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes and 256 Bytes.

**Maximum Read Request**

Select Auto to allow the system BIOS to automatically set the maximum Read Request size for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

**ASPM Support**

This feature allows the user to set the Active State Power Management (ASPM) level for a PCI-E device. Select Force L0 to force all PCI-E links to operate at L0 state. Select Auto to allow the system BIOS to automatically set the ASPM level for the system. Select Disabled to disable ASPM support. The options are **Disabled**, Force L0, and Auto.

**Warning**: Enabling ASPM support may cause some PCI-E devices to fail!

**Onboard LAN Option ROM Select**

Select iSCSI to use the iSCSI Option ROM to boot the computer using a network device. Select PXE (Preboot Execution Environment) to use an PXE Option ROM to boot the computer using a network device. The options are iSCSI and **PXE**.

**Load Onboard LAN1 Option ROM/Load Onboard LAN2 Option ROM/ Load Onboard LAN3 Option ROM/ Load Onboard LAN4 Option ROM**

Select Enabled to enable the onboard LAN1 Option ROM~LAN4 Option ROM. This is to boot the computer using a network device. The default setting for LAN1 Option ROM is **Enabled**, and the default setting for LAN2~LAN4 Option ROM is **Disabled**.

**VGA Priority**

This feature allows the user to select the graphics adapter to be used as the primary boot device. The options are **Onboard**, and Offboard.

**Network Stack**

Select Enabled enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible Firmware Interface) for network stack support. The options are Enabled and **Disabled**.

## ▶Super IO Configuration

**Super IO Chip:** This item displays the Super IO chip used in the motherboard.

## ▶Serial Port 1 Configuration

**Serial Port**

Select Enabled to enable a serial port specified by the user. The options are **Enabled** and Disabled.

**Device Settings**

This item displays the settings of Serial Port 1.

**Change Settings**

Use this feature to set the optimal Environment Control Interface (PECI) setting for a serial port specified. The default setting is **Auto**, which will allow the AMI BIOS to automatically select the best setting for the PECI platform.

**Device Mode**

Use this feature to select the desired mode for a serial port specified. The options are **Normal** and High Speed.

## ▶Serial Port 2 Configuration

**Serial Port**

Select Enabled to enable a serial port specified by the user. The options are **Enabled** and Disabled.

**Device Settings**

This item displays the settings of Serial Port 2.

**Change Settings**

Use this feature to set the optimal Environment Control Interface (PECI) setting for a serial port specified. The default setting is **Auto**, which will allow the AMI BIOS to automatically select the best setting for the PECI platform.

**Device Mode**

Use this feature to select the desired mode for a serial port specified. The options are **Normal** and High Speed.

**Serial Port 2 Attribute**

Use this feature to select the attribute for serial port 2. The options are **SOL** (Serial On LAN), and COM.

## ▶Serial Port Console Redirection

**COM 1/COM 2/SOL**

These two submenus allow the user to configure the following Console Redirection settings for a COM Port specified by the user.

**Console Redirection**

Select Enabled to use a COM Port selected by the user for Console Redirection. The options are Enabled and Disabled. The default setting for COM1 is **Disabled**, and for COM2 is **Enabled**.

## ▶Console Redirection Settings

This feature allows the user to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

**Terminal Type**

This feature allows the user to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

**Bits Per second**

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600 and **115200** (bits per second).

**Data Bits**

Use this feature to set the data transmission size for Console Redirection. The options are 7 Bits and **8 Bits**.

**Parity**

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits

in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark and Space.

**Stop Bits**

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

**Flow Control**

This feature allows the user to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

**VT-UTF8 Combo Key Support**

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled**.**

**Recorder Mode**

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

**Resolution 100x31**

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

**Legacy OS Redirection Resolution**

Use this feature to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

**Putty KeyPad**

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SC0, ESCN, and VT400.

**Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)**

The submenu allows the user to configure Console Redirection settings to support Out-of-Band Serial Port management.

**Console Redirection**

Select Enabled to use a COM Port selected by the user for Console Redirection. The options are **Enabled** and Disabled.

### ▶Console Redirection Settings

This feature allows the user to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

**Out-of-Band Management Port**

The feature selects a serial port used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote server. The options are **COM1** and COM2.

**Terminal Type**

This feature allows the user to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

**Bits Per Second**

This item sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

**Flow Control**

This feature allows the user to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None,** Hardware RTS/CTS, and Software Xon/Xoff.

## ▶ACPI Settings

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

**ACPI Sleep State**

Use this feature to select the ACPI State when the system is in sleep mode. Select S1 (CPU_Stop_Clock) to erase all CPU caches and stop executing instructions. Power to the CPU(s) and RAM is maintained, but RAM is refreshed. Select Suspend

to use power-reduced mode. Power will only be supplied to limited components (such as RAMs) to maintain the most critical functions of the system. The options are **S1 (CPU_Stop_Clock)**, and Suspend Disabled.

**NUMA (NON-Uniform Memory Access)**

This feature enables the Non-Uniform Memory Access ACPI support. The options are **Enabled** and Disabled.

**High Precision Event Timer**

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback, reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

## ▶Trusted Computing (Available when a TPM device is detected by the BIOS)

**Configuration**

**TPM Support**

Select Enabled on this item and enable the TPM jumper on the motherboard to enable TPM support to improve data integrity and network security. The options are **Enabled** and Disabled.

**TPM State**

Select Enabled to enable TPM security settings to improve data integrity and network security. The options are **Disabled** and Enabled.

**Pending Operation:** This item displays the status of a pending operation.

**Current Status Information:** This item displays the information regarding the current TPM status.

### TPM Enable Status

This item displays the status of TPM Support to indicate if TPM is currently enabled or disabled.

**TPM Active Status**

This item displays the status of TPM Support to indicate if TPM is currently active or deactivated.

**TPM Owner Status**

This item displays the status of TPM Ownership.

## ▶Intel TXT (LT-SX) Configuration

**Intel TXT (LT-SX) Hardware Support**

This feature indicates if the following hardware components support the Intel Trusted Execution Technology.

**CPU**: TXT (Trusted Execution Technology) Feature

**Chipset**: TXT (Trusted Execution Technology) Feature

**Intel TXT (LT-SX) Configuration**

This feature displays the following TXT configuration setting.

**TXT (LT-SX) Support:** This item indicated if the Intel TXT support is enabled or disabled.

**Intel TXT (LT-SX) Dependencies**

This feature displays the features that need to be enabled for the Intel Trusted Execution Technology to work properly in the system.

**VT-d Support**: Intel Virtualization Technology with Direct I/O support

**VT Support**: Intel Virtualization Technology support

**TPM Support**: Trusted Platform support

**TPM State**: Trusted Platform state

## ▶ME Subsystem

This feature displays the following ME Subsystem Configuration settings.

- **ME BIOS Interface Version**
- **ME Version**

**iSCSI Configuration:** This item displays iSCSI configuration information:

**iSCSI Initiator Name**: This item displays the name of the iSCSI Initiator, which is a unique name used in the world.

**Intel® I350 Gigabit Network Connections**: These items display the following information on the Intel I350 LAN connections.

## ▶NIC Configuration

**Link Speed**

Use this feature to change the link speed and duplex for the current port. The options are **AutoNeg**, 10Mbps Half, 10Mbps Full, 100Mbps Half, and 100Mbps full.

**Wake on LAN**

Select enabled to wake the system with a magic packet. The options are **Enabled** and Disabled.

**Blink LEDs**

This feature allows the user to specify the duration for LEDs to blink. The range is from 0 ~ 15 seconds.

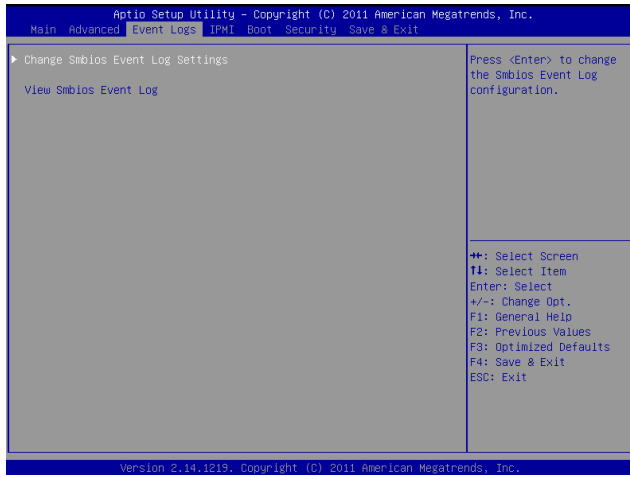
**PORT CONFIGURATION INFORMATION**

This section displays the following port information:

- UEFI Driver
- Adapter PBA
- Chip Type
- PCI Device ID
- PCI Bus:Device:Function
- Link Status
- Factory MAC Address
- Alternate MAC Address

# 7-4 Event Logs

Use this feature to configure Event Log settings.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Event Logs IPMI Boot Security Save & Exit
Change Smbios Event Log Settings
View Smbios Event Log
Press <Enter> to change the Smbios Event Log configuration.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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## ▶Change SMBIOS Event Log Settings

This feature allows the user to configure SMBIOS Event settings.

### Enabling/Disabling Options

### SMBIOS Event Log

Select Enabled to enable SMBIOS (System Management BIOS) Event Logging during system boot. The options are **Enabled** and Disabled.

### Runtime Error Logging Support

Select Enabled to support Runtime Error Logging. The options are **Enabled** and Disabled.

### Memory Correctable Error Threshold

This feature allows the user to enter the threshold value for correctable memory errors. The default setting is **10**.

### PCI Error Logging Support

Select Enabled to support error event logging for PCI slots. The options are Enabled and **Disabled**.

**Erasing Settings**

**Erase Event Log**

Select Enabled to erase the SMBIOS (System Management BIOS) Event Log, which is completed before a event logging is initialized upon system reboot. The options are **No** and Yes.

**When Log is Full**

Select Erase Immediately to immediately erase SMBIOS error event logs that exceed the limit when the SMBIOS event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

**SMBIOS Event Log Standard Settings**

**Log System Boot Event**

Select Enabled to log system boot events. The options are **Disabled** and Enabled.

**MECI (Multiple Event Count Increment)**

Enter the increment value for the multiple event counter. Enter a number between 1 to 255. The default setting is **1**.

**METW (Multiple Event Count Time Window)**

This item allows the user to decide how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**.

**View SMBIOS Event Log**

This item allows the user to view the event in the SMBIOS event log. Select this item and press <Enter> to view the status of an event in the log.

Date/Time/Error Code/Severity

**View System Event Log**

This item allows the user to view the event in the system event log. Select this item and press <Enter> to view the status of an event in the log.

Date/Time/Sensor/Type

## 7-5 IPMI

Use this feature to configure Intelligent Platform Management Interface (IPMI) settings.

### IPMI Firmware Revision

This item indicates the IPMI firmware revision used in your system.

### IPMI Status

This item indicates the status of the IPMI firmware installed in your system.

## ▶System Event Log

### Enabling/Disabling Options

### SEL Components

Select Enabled for all system event logging at bootup. The options are **Enabled** and Disabled.

### Erasing Settings

### Erase SEL

Select Yes, On next reset to erase all system event logs upon next system reboot. Select Yes, On every reset to erase all system event logs upon each system reboot. Select No to keep all system event logs after each system reboot. The options are **No,** Yes, On next reset, and Yes, On every reset.

**When SEL is Full**

This feature allows the user to decide what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

**Custom EFI Logging Options**

**Log EFI Status Codes**

Select Enabled to log EFI (Extensible Firmware Interface) Status Codes, Error Codes or Progress Codes. The options are **Enabled** and Disabled.

**Note**: After making changes on a setting, be sure to reboot the system for the changes to take effect.

## ▶BMC Network Configuration

**LAN Channel 1**: This feature allows the user to configure the settings for LAN1 Port.

**Update IPMI LAN Configuration**

This feature allows the user to decide if the BIOS should configure the IPMI setting at next system boot. The options are **No** and Yes. If the option is set to Yes, the user is allow to configure the IPMI settings at next system boot:

**Configuration Address Source**

This feature allows the user to select the source of the IP address for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server in the network that is attached to and request the next available IP address for this computer. The options are **DHCP** and Static. The following items are assigned IP addresses automatically if DHCP is selected.

**Station IP Address**

This item displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

**Subnet Mask**

This item displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.

**Station MAC Address**

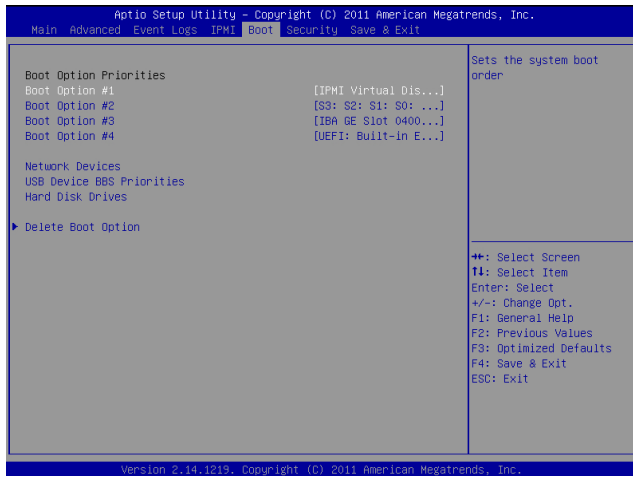
This item displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

### Gateway IP Address

This item displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

## 7-6 Boot

This submenu allows the user to configure the following boot settings for the system.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Event Logs IPMI Boot Security Save & Exit
Boot Option Priorities
Boot Option #1 [IPMI Virtual Dis...]
Boot Option #2 [S3: S2: S1: S0: ...]
Boot Option #3 [IBA GE Slot 0400...]
Boot Option #4 [UEFI: Built-in E...]
Network Devices
USB Device BBS Priorities
Hard Disk Drives
Delete Boot Option
Sets the system boot order
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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### Boot Option Priorities

### Boot Option #1/ Boot Option #2/ Boot Option #3, etc.

Use this feature to specify the sequence of boot device priority.

### USB Device BBS Priorities, Network Device BBS Priorities, Hard Disk Drives

Use these options to set the order of the legacy network and USB devices detected by the motherboard.

### Add New Boot Option

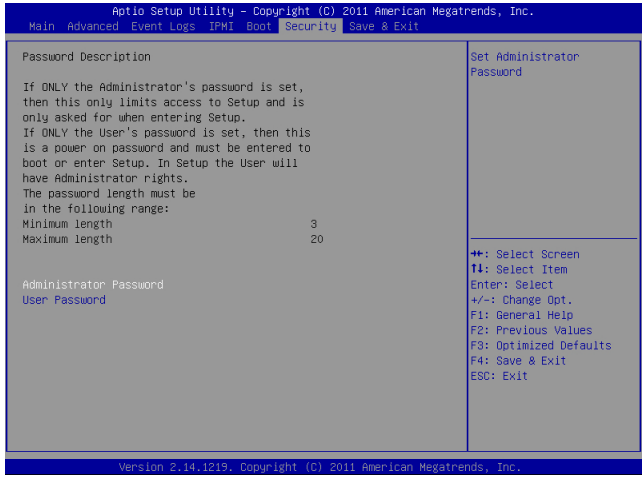
This feature allows the user to add a new EFI boot option to the boot order.

### ▶Delete Boot Option

This feature allows the user to select a boot device to delete from the boot priority list.

## 7-7 Security

This menu allows the user to configure the following security settings for the system.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Event Logs IPMI Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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### Administrator Password

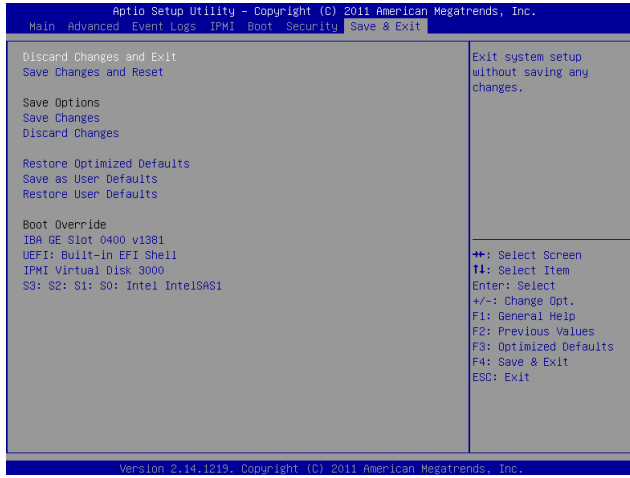
Use this feature to set the Administrator Password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 8 characters long.

### User Password

Use this feature to set a User Password which is required to log into the system and to enter the BIOS setup utility. The length of the password should be from 3 characters to 8 characters long.

## 7-8 Save & Exit

This submenu allows the user to configure the Save and Exit settings for the system.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Event Logs IPMI Boot Security Save & Exit
Discard Changes and Exit
Save Changes and Reset
Save Options
Save Changes
Discard Changes
Restore Optimized Defaults
Save as User Defaults
Restore User Defaults
Boot Override
IBA GE Slot 0400 v1381
UEFI: Built-in EFI Shell
IPMI Virtual Disk 3000
S3: S2: S1: S0: Intel IntelSAS1
Exit system setup without saving any changes.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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### Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, click **Yes** to quit BIOS without saving the changes, or click No to quit the BIOS and save changes.

### Save Changes and Reset

When you have completed the system configuration changes, select this option to save the changes and reboot the computer so that the new system configuration settings can take effect. Select Save Changes and Exit, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, click **Yes** to quit BIOS without saving the changes, or click No to quit the BIOS and save changes.

### Save Options

### Save Changes

Select this option and press <Enter> to save all changes you've done so far and return to the AMI BIOS utility Program. When the dialog box appears, asking you if you want to save configuration, click **Yes** to save the changes, or click No to return to the BIOS without making changes.

**Discard Changes**

Select this feature and press <Enter> to discard all the changes and return to the BIOS setup. When the dialog box appears, asking you if you want to load previous values, click **Yes** to load the values previous saved, or click No to keep the changes you've made so far.

**Restore Optimized Defaults**

Select this feature and press <Enter> to load the optimized default settings that help optimize system performance. When the dialog box appears, asking you if you want to load optimized defaults, click **Yes** to load the optimized default settings, or click No to abandon optimized defaults.

**Save as User Defaults**

Select this feature and press <Enter> to save the current settings as the user's defaults. When the dialog box appears, asking you if you want to save values as user's defaults, click **Yes** to save the current values as user's default settings, or click No to keep the defaults previously saved as the user's defaults.

**Restore User Defaults**

Select this feature and press <Enter> to load the user's defaults previously saved in the system. When the dialog box appears, asking you if you want to restore user's defaults, click **Yes** to restore the user's defaults previously saved in the system, or click No to abandon the user's defaults that were previously saved.

**Boot Override**

This feature allows the user to enter a new setting to overwrite the original setting that was saved for the devices listed:

# Appendix A

# BIOS Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

**Non-fatal errors** are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

**Fatal errors** are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list (on the following page) correspond to the number of beeps for the corresponding error. All errors listed, with the exception of Beep Code 8, are fatal errors.

| Beep Code | Error Message | Description |
|---|---|---|
| 1 beep | Refresh | Circuits have been reset (Ready to power up) |
| 5 short beeps and 1 long beep | Memory error | No memory detected in the system |
| 5 beeps | No Con-In or Con-Out devices | Con-In includes USB or PS/2 keyboard, PCI or serial console redirection, IPMI KVM or SOL. Con-Out includes video controller, PCI or serial console redirection, IPMI SOL. |
| 1 Continuous beep | System OH | System Overheat |

# Notes

# Appendix B

# System Specifications

### Processors

Single or dual Intel® E5-2600 Series processors in LGA2011 sockets

Note: Please refer to our web site for a complete listing of supported processors.

### Chipset

Intel C606 chipset

### BIOS

16 Mb AMI® SPI Flash EEPROM

### Memory Capacity

Twenty-four DIMM sockets supporting up to 768 GB of ECC registered DDR3-1333/1066/800 RDIMMs or up to 192 GB of unbuffered DDR3-1333/1066/800 UDIMMs

See the memory section in Chapter 5 for details.

### SAS Controller

Intel chipset-based SAS controller for eight SAS ports, which supports RAID 0, 1 and 10

### SATA Controller

Intel chipset-based SATA controller for six-port SATA, which supports RAID 0, 1, 5 and 10 (Two SATA 3.0 and four SATA 2.0 ports)

### Drive Bays

Ten hot-swap drive bays to house 3.5" hard drives

### Expansion Slots

Two PCI-E 3.0 x16 and two PCI-E 3.0 x8 cards (w/ RSC-R2UW+-2E16-2E8-O-P riser) and two low-profile PCI-E 3.0 x8 low-profile cards (w/ RSC-R2UW-E8R-O-P riser)

### Serverboard

6027R-N3RF4+: X9DRW-3LN4F+ (Proprietary form factor)
6027R-N3RFT+: X9DRW-3TF+ (Proprietary form factor)
Dimensions: 16.5 x 12.8 in (419 x 325 mm)

### Chassis

SC829BTQ-R920B (2U rackmount)
Dimensions: (WxHxD) 17.2 x 3.5 x 27.75 in. (437 x 89 x 705 mm)

### Weight

Gross Weight: 55 lbs. (25 kg.)

### System Cooling

Four 8-cm high-performance fans

### System Input Requirements

AC Input Voltage: 100 - 240V AC auto-range
Rated Input Current: 13 - 4A max
Rated Input Frequency: 50 to 60 Hz

### Power Supply

Rated Output Power: 920W (Part# PWS-920P-1R)
Rated Output Voltages: +12V (75A), +5Vsb (4A)

### Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)
Non-operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 8% to 90% (non-condensing)
Non-operating Relative Humidity: 5 to 95% (non-condensing)

## Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. “Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate”

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